

**Pages 1 - 121**

UNITED STATES DISTRICT COURT

NORTHERN DISTRICT OF CALIFORNIA

Before The Honorable James Donato, Judge

IN RE GOOGLE PLAY STORE )  
ANTITRUST LITIGATION ) **NO. 21-md-02981 JD**  
\_\_\_\_\_ )

San Francisco, California  
Tuesday, July 19, 2022

**TRANSCRIPT OF PROCEEDINGS**

**APPEARANCES:**

For Plaintiff Epic Games:

CRAVATH SWAINE AND MOORE LLP  
825 Eighth Avenue  
New York, New York 10019

**BY: LAUREN ANN MOSKOWITZ, ATTORNEY AT LAW**

FAEGRE DRINKER BIDDLE & REATH LLP  
Four Embarcadero Center  
27th Floor  
San Francisco, California 94111

**BY: PAUL J. RIEHLE, ATTORNEY AT LAW**

For the Consumer Class Plaintiffs:

KAPLAN FOX AND KILSHEIMER LLP  
850 Third Avenue  
14th Floor  
New York, New York 10022

**BY: HAE SUNG NAM, ATTORNEY AT LAW**  
**GREGORY K. ARENSON, ATTORNEY AT LAW**

**(APPEARANCES CONTINUED ON FOLLOWING PAGE)**

REPORTED BY: Ana Dub, RDR, RMR, CRR, CCRR, CRG, CCG  
CSR No. 7445, Official United States Reporter

**APPEARANCES:** (CONTINUED)

For the Consumer Class Plaintiffs:

BARTLIT BECK LLP  
1801 Wewatta Street  
Suite 1200  
Denver, Colorado 80202

**BY: KARMA M. GIULIANELLI, ATTORNEY AT LAW**

BARTLIT BECK LLP  
54 West Hubbard Street  
Suite 300  
Chicago, Illinois 60654

**BY: LEE M. MASON, ATTORNEY AT LAW**

For Plaintiff Brian McNamara:

COTCHETT, PITRE & MCCARTHY LLP  
San Francisco Airport Office Center  
840 Malcolm Road  
Burlingame, California 94010

**BY: JAMES G.B. DALLAL, ATTORNEY AT LAW**

For State of California:

OFFICE OF THE ATTORNEY GENERAL  
OF CALIFORNIA  
California Department of Justice  
455 Golden Gate Avenue  
Suite 11000  
San Francisco, California 94102

**BY: PAULA L. BLIZZARD, ATTORNEY AT LAW**

For State of Utah:

OFFICE OF THE UTAH ATTORNEY GENERAL  
160 East 300 South  
Fifth Floor  
Salt Lake City, Utah 84114

**BY: BRENDAN P. GLACKIN, ATTORNEY AT LAW  
LAUREN M. WEINSTEIN, ATTORNEY AT LAW**

(APPEARANCES CONTINUED ON FOLLOWING PAGE)

**APPEARANCES:** (CONTINUED)

For Defendants:

MORGAN LEWIS & BOCKIUS LLP  
One Market Street  
Spear Street Tower  
San Francisco, California 94105

**BY: BRIAN C. ROCCA, ATTORNEY AT LAW**  
**SUJAL SHAH, ATTORNEY AT LAW**

MUNGER, TOLLES & OLSON LLP  
560 Mission Street, 27th Floor  
San Francisco, California 94105

**BY: JUSTIN P. RAPHAEL, ATTORNEY AT LAW**

MUNGER TOLLES & OLSON LLP  
350 South Grand Avenue  
Fiftieth Floor  
Los Angeles, California 90071

**BY: GLENN D. POMERANTZ, ATTORNEY AT LAW**

Also Present:

**Michelle M. Burtis, Ph.D.**  
**Hal J. Singer, Ph.D.**  
**Nathan Hatch**

Tuesday - July 19, 2022

2:00 p.m.

P R O C E E D I N G S

---o0o---

**THE CLERK:** Now calling Civil Case 21-md-2981, In Re Google Play Store Antitrust Litigation.

**THE COURT:** Okay. Welcome. Let's see. Who do we have? Who's here?

**DR. BURTIS:** Hi, Your Honor. I'm Michelle Burtis.

**THE COURT:** Dr. Burtis.

**DR. BURTIS:** Yes.

**THE COURT:** Okay. And who is this?

**MR. HATCH:** My name is Nathan Hatch. Nathan Hatch. I'm helping with the slides.

**THE COURT:** All right. And you're with Dr. Burtis?

**MR. HATCH:** Yes.

**THE COURT:** You're not an attorney?

**MR. HATCH:** No.

**THE COURT:** Okay. Oh, if you're fully vaccinated and you're comfortable, you can remove your masks. It's totally up to you, but you're certainly welcome to do that.

And for plaintiffs?

**DR. SINGER:** Your Honor, Hal Singer.

**THE COURT:** We have to use the mics.

**DR. SINGER:** Hal Singer, Your Honor, for plaintiffs.

**MR. DALLAL:** And, Your Honor, my name is James Dallal. I

1 am an attorney, but we do not have any non-attorney members in  
2 our team. So my role in this proceeding will be limited to the  
3 slides.

4 **THE COURT:** You're just handling the slides.

5 Okay. All right. Well, I'm here for one of my favorite  
6 types of hearings. So here is our format. We're going to  
7 swear you in. And we'll begin with plaintiffs. I have the  
8 list of topics that you two negotiated in descending order of  
9 criticality, importance; right? Okay. And I'm going to set  
10 the stage with a question of my own that I want both of you to  
11 focus on as you go through this.

12 And then, at the end of it, I'll ask if there are any  
13 lawyers who have questions. You can come up and make an  
14 appearance and ask your questions. Whether I let you ask the  
15 questions or not, we'll see; but I'll certainly let you pose  
16 the question.

17 Okay. Let's begin. So you can stay seated, or you can  
18 stand at the podium, either way. But just have a microphone in  
19 front of you. Otherwise, we won't be able to hear you. Okay?

20 All right. Bhavna, would you swear in the economists.

21 **THE CLERK:** Yes.

22 Please raise your right hand.

23 (Dr. Burtis and Dr. Singer placed under oath.)

24 **DR. BURTIS:** I do.

25 **DR. SINGER:** I do.

1       **THE CLERK:** Thank you.

2       **THE COURT:** All right. So we'll go down the topics in  
3 Exhibit 1, starting with that first topic, which is  
4 "Dr. Singer's Estimates of Google's But-For Service Fee Rates."

5       Here is what I would like you to focus on as we have our  
6 discussion. I would like to understand the method and the  
7 techniques that the plaintiffs are going to use to establish  
8 that there is some uniform way of determining that, but for the  
9 challenged conduct, Google would have had lower service fees to  
10 the developers. That's Part 1.

11       And Part 2 is the same premise with respect to the but-for  
12 conduct; that there is some uniform way of establishing that  
13 consumers would have paid less for apps. That is what I'm most  
14 interested in.

15       Now, remember that the point here is to determine the  
16 reliability and confidence of the methods that are going to be  
17 used by the economists. I'm most interested in hearing about,  
18 for example, anything that the defendants think Dr. Singer is  
19 doing that is well beyond the purview of what an economist  
20 would normally do, and Dr. Singer's response to that. The more  
21 cross-examination points, "Well, Dr. Singer didn't take into  
22 account certain factors, X, Y, and Z," I'm not interested in.  
23 All right? This is about reliability, acceptance, the ability  
24 to replicate results, the soundness of the technique. That is  
25 what our focus is on. Okay?

1 All right. So, Dr. Singer, you are on plaintiff side.  
2 Why don't you begin. Topic 1.

3 **DR. SINGER:** Thank you so much. And good afternoon,  
4 Your Honor. It's very nice to see you again.

5 **THE COURT:** By the way, you two can -- this is meant to be  
6 an interactive exchange. So you can pose questions to each  
7 other, not interrupting, but certainly during your  
8 presentations. And if I don't like the question, I'll just ask  
9 you to move on, but you can certainly ask. Okay? It's meant  
10 to be more of a conversation. All right? That's the hot tub  
11 aspect.

12 **DR. SINGER:** Sure.

13 **THE COURT:** You don't deliver monologues in a hot tub.  
14 You interact.

15 (Laughter.)

16 **THE COURT:** At least the hot tubs that you want to be in.  
17 Okay.

18 **DR. SINGER:** So the first topic, Your Honor, is my  
19 estimation of the but-for take rates. I like to call them the  
20 take rates. I think Google calls them the service rates.  
21 Hopefully, we can still be friends.

22 I used two different models to model the but-for take  
23 rates. I have one model for the app distribution market, and I  
24 have a separate model for the in-app aftermarket support  
25 services. And if it's okay with you, I'd like to present each

1 one separately in succession, just so that we don't get  
2 confused. They're separate markets, separate models. Is that  
3 okay, Your Honor?

4 **THE COURT:** That's fine.

5 **DR. SINGER:** Okay. Thank you so much.

6 So if we start with the app distribution market, I only  
7 have three points here.

8 The first point is, the Rochet-Tirole model is generally  
9 accepted and fits the facts of this case.

10 Can I see Slide 1, please?

11 You'll see on Slide 1 a two-sided market here. Now, we  
12 need a two-sided platform model to capture the two-sided nature  
13 of the Android app distribution market. Google is centered in  
14 this figure, you can see, and Google is the matchmaker.  
15 They're bringing together consumers on one side of the market  
16 and app developers on the other side of the market. And  
17 they're taking advantage of this wonderful thing called  
18 indirect network effects, which is what makes this a two-sided  
19 market.

20 Indirect network effects means that as more developers  
21 come to the platform, the consumers on the other side of the  
22 market derive greater value for being members or on the  
23 platform and vice versa. As more consumers come to the  
24 market -- come to the platform, the developers find the  
25 platform more valuable. Hence, the name "indirect network



1 effects." Okay?

2 And the good news here is that a Nobel Prize winner,  
3 Jean Tirole, and his co-author, Jean-Charles Rochet, created  
4 the foundational model of pricing in a two-sided market, and  
5 that's the model that I used to estimate the but-for take rate.

6 Point Number 2, the Rochet-Tirole model employs real-world  
7 data for this case.

8 Can I see Slide 2, please?

9 This is going to show you all of the inputs that informed  
10 the Rochet-Tirole model. Now, I'm not going to take you  
11 through them all, Your Honor. But I would like to point out  
12 that once we have the right model, what we have to do is  
13 provide inputs to the model. And this is where we get into the  
14 dispute. Okay?

15 Now, I use real-world data. Just to give an example,  
16 Google's marginal cost was a key input. It comes from their  
17 financial data. I need prices on both sides of the market.  
18 That was calculated from Google's transactional data.

19 Pass-through is an input. And there is a dispute over  
20 the -- on the pass-through for sure; but I'd like to table that  
21 one, because we're going to have an entire debate on  
22 pass-through, and focus on what I think is the remaining issue  
23 for this model.

24 Now, for this pass, I use the Rochet-Tirole model to  
25 estimate a but-for take rate -- that is, the price that's

1 charged to the developers in a but-for world absent the  
2 challenged conduct -- holding the subsidy to consumers on the  
3 other side of the market constant.

4 And another pass -- and we're going to debate this too;  
5 it's called the play points model -- I do the opposite. I  
6 solve for the but-for subsidy in the advent of more  
7 competition, holding constant the take rate.

8 And then I do a third one called the hybrid. We're not  
9 going to debate that one today, but just so that you know, I've  
10 done that one as well.

11 And my third and final point for this section -- then I  
12 can pass the baton over to Dr. Burtis -- is that other than  
13 suggesting that it can't be used marketwide, Dr. Burtis largely  
14 gives the Rochet-Tirole model a pass. She doesn't dispute that  
15 the Rochet-Tirole model is standard. She doesn't dispute that  
16 it's widely accepted in the literature. She lodges two primary  
17 attacks. The first is that it can't be estimated on a  
18 marketwide basis, and the second is she has the problem with  
19 the pass-through.

20 **THE COURT:** If I could, so the Rochet-Tirole model is  
21 going to yield one number for everyone?

22 **DR. SINGER:** Yes.

23 **THE COURT:** A percentage for everyone?

24 **DR. SINGER:** What it's going to yield on this go-through,  
25 Your Honor, is a but-for headline take rate. And the reason

1 why I'm going to use it to generate a but-for headline take  
2 rate, a singular but-for headline take rate is because Google  
3 uses a singular headline take rate in the actual world. That's  
4 the 30 percent number.

5 Now, it's true that Google occasionally will negotiate --

6 **THE COURT:** They use it for what? For --

7 **DR. SINGER:** They use it as the starting place for every  
8 developer's price to join the platform. It is true --

9 **THE COURT:** In other words, that's the list price, so to  
10 speak?

11 **DR. SINGER:** That's a nice way of putting it. In a  
12 pharmaceutical case, it might be called the rack price; but  
13 here, I consider it as the headline rate.

14 And what Google does, Your Honor, is they selectively  
15 enter into discounts off the headline rate. But all  
16 negotiations begin with the headline rate, and importantly,  
17 none of the negotiations are done on an individual basis. None  
18 of them.

19 When Google makes an exception to the but-for headline  
20 take rate, as it did -- for example, Your Honor, you'll  
21 remember in 2018, Google cut the second year -- the  
22 subscription -- sorry -- the take rate for subscription  
23 products in Year 2 from 30 to 15 percent. That applied to  
24 every developer who had a subscription product. That was not  
25 negotiated on an individualized basis. Anybody who had a

1 subscription product was entitled to the 15 percent.

2 All right?

3 So that's the Reason Number 1 that this model should be  
4 applied on a marketwide basis, because I want to mimic what  
5 Google does, how it constructs its pricing, just as it does in  
6 the actual world, absent the challenged conduct.

7 Dr. Burtis would have you believe that in the but-for  
8 world, Google would enter into hundreds, if not thousands, of  
9 individualized negotiations with each app developer. And I ask  
10 you, if they're not doing that today, why would they do that in  
11 the but-for world in the absence of the challenged conduct?

12 The business model is going to stay the same.

13 And there's one other reason, Your Honor, and then I'll  
14 turn over the baton; and that is -- for using it on a  
15 marketwide basis; and that is, Google is offering the same  
16 basic service to all developers. Right? It is a matchmaker.  
17 "Come to our platform and we'll provide you a boatload of  
18 users." These aren't individualized or differentiated products  
19 that Google's offering. By and large, everyone who comes gets  
20 the same service.

21 So for those two reasons, Your Honor -- we're mimicking  
22 what Google does in the actual world and it's the same basic  
23 product -- for those two reasons, it makes sense to have a  
24 model that delivers a singular but-for headline rate. The  
25 Rochet-Tirole model is the best model in the literature that

1 can do that, and that's exactly what I used it for.

2 **THE COURT:** And what is that number?

3 **DR. SINGER:** The but-for take rate -- well, in the --  
4 going by memory, it's around 15 percent in the but-for world.  
5 It's 30 percent today. I go to 15 percent.

6 And importantly, any developer who is able to negotiate --  
7 not individually, but within its group. Whatever developer was  
8 able to secure a lower discount rate, a discount off that  
9 30 percent, I applied the same discount in proportional terms  
10 that they achieved in the actual world into the but-for world.

11 **THE COURT:** Let me ask you this: Do you know how many  
12 developers got special deals off the list price?

13 **DR. SINGER:** Very small number. I can tell you that there  
14 was one program called LRAP, the Living Room Accelerator  
15 Program, Your Honor, LRAP, and I believe about 50 of the  
16 largest developers got deals. But, again, everyone got the  
17 same deal. It was not individually negotiated. And these  
18 developers, I think, accounted for one-tenth of 1 percent of  
19 the developers in the database.

20 **THE COURT:** All right. Dr. Burtis, what's wrong with  
21 that?

22 **DR. BURTIS:** Well --

23 **THE COURT:** Do you have any objection to the R-T model?

24 **DR. BURTIS:** So let me say just a few things.

25 **THE COURT:** A little closer to the mic.

1       **DR. BURTIS:** How that's? Better?

2       **THE COURT:** Slightly. Can you pull it a little closer to  
3 you? Good. Okay.

4       **DR. BURTIS:** How's that?

5       **THE COURT:** That's better.

6       **DR. BURTIS:** Okay. Okay. So, Your Honor, a few things  
7 about these various models. First, I wasn't asked to evaluate  
8 whether or not these models were the right models for merits,  
9 and so I'm not going to talk to you about that. The only issue  
10 for me is whether these models can analyze the issue of whether  
11 or not all of the but-for service fee rates would be lower.

12       And so I wanted -- and let me just say something about  
13 these models, because Dr. Singer -- I think he still has his  
14 slide up here for Table 3. This is essentially the model. So  
15 this is not like -- you might be, you know, used to econometric  
16 models, for example, where you estimate an overcharge. What  
17 these models are, it's like a list of equations; and  
18 Dr. Singer, you know, inserts or inputs particular numbers into  
19 the equations and then solves them for a single number.

20       And so the point that I'm going to make here is that all  
21 of those inputs -- and you can look at Table 3 or Table 5.  
22 He's got a couple of slides -- every one of those inputs is  
23 either an aggregate, like total consumer expenditure in  
24 Google Play, or it's an average.

25       Like, for example, in -- it's not up anymore. In Table 3,

1 I believe the average price for all apps he has in there is  
2 \$3.99. And in his model for IAPs -- that's the in-app  
3 purchases -- which is a separate model, the average price is  
4 \$8.99. Even though there's tremendous variation in those  
5 prices, it's just a single number.

6 Every one of those numbers in these models are like that.  
7 They're either an aggregate or an average.

8 So a couple of things. One is that Dr. Singer said there  
9 was absolutely no individualized negotiations. That's not  
10 actually true.

11 **THE COURT:** Let me just -- I may have missed your answer,  
12 but as a concept, though, the Rochet-Tirole approach is sound  
13 in this market, if you assume it's a two-sided platform market;  
14 right?

15 **DR. BURTIS:** So as I said, you know, I don't want, as an  
16 expert who's here for Google, to say that this is the right  
17 model for --

18 **THE COURT:** I'm not saying -- no, that's not the issue.  
19 The issue is --

20 **DR. BURTIS:** Okay.

21 **THE COURT:** -- is this so far off the charts that --

22 **DR. BURTIS:** Oh, no.

23 **THE COURT:** -- no reasonable economist would ever use a  
24 Rochet-Tirole model to analyze -- you may not agree with the  
25 output or the inputs, but just the model selection itself,

1 you're okay with that?

2 **DR. BURTIS:** You know, it is used in economic literature,  
3 Your Honor. It is.

4 **THE COURT:** Okay.

5 **DR. BURTIS:** It is, of course, not used to analyze common  
6 impact. But it is used in the way that Dr. Singer is using it  
7 here, which is kind of an average or overall effect, because  
8 the model is -- it does produce a single answer and it does  
9 produce either impact for everybody or no impact for everybody.  
10 It's just -- you know, it's a one-for-all or all-for-one kind  
11 of result.

12 And let me say, the other thing about the model is that it  
13 turns on Dr. Singer's assumption about what will happen to  
14 Google's market share in the but-for world. That's very key in  
15 these models.

16 And so one thing that happens in these models is, like, if  
17 you reduce their market share for, like, 1 percent or  
18 2 percent, just a little bit, what you're going to get is a  
19 reduction in the service fee rate for everybody. And that is  
20 not the way that competition in this market has worked. Right?

21 What we see -- and I talk about this in my report when I  
22 talk about the characteristics of this business -- developers  
23 and apps are very different from one another. And there are  
24 some developers with really popular apps, and they have the  
25 ability to move consumers from one store to another. And so



1 Google will focus on those developers and they will offer those  
2 developers deals. And, in fact, they have individually  
3 negotiated deals with certain developers. And I talk about  
4 this in my report. And in my report, in Exhibit 8, there's,  
5 like, a list of all of these developers who got these special  
6 deals.

7 So the model is fine for what it is, for the way that it  
8 is used in the literature, but it's not addressing the issue of  
9 common impact. Right? It's assuming --

10 **THE COURT:** Well, Dr. Singer says that Google's business  
11 practice, what it does every day with developers is to start  
12 with the list price, the rack rate of 30 percent.

13 Do you disagree with that?

14 **DR. BURTIS:** I think that's an assumption on his part.

15 What Google has done is offered different rates. It has  
16 offered 15 percent to --

17 **THE COURT:** Well, that may be; but the starting point, the  
18 baseline is 30 percent. You walk in the door at the  
19 Play Store; 30 percent is on the table. Then you may have the  
20 consumer demand to negotiate a sweeter deal for yourself if  
21 you're a developer.

22 But do you disagree -- and, if so, you need to tell me  
23 why. Do you disagree with the proposition that the list rate,  
24 the rack rate, is 30 percent for everybody? That's the  
25 starting point, at least, for everybody in the Play Store.

1       **DR. BURTIS:** So I guess I do disagree. I mean, it's -- it  
2 is unclear how -- why we can just assume that a rate of  
3 15 percent is a discount off of 30. I mean, it's 15 percent.  
4 And I don't know -- I mean, there's no reason that you have to  
5 say that it's a discount off of 30. It is what it is.

6       And just to go back to the deal -- to the developers who  
7 are negotiating these deals with Google, they are negotiating  
8 for services. And each of these deals are customized to the  
9 individual developer. They are heavily negotiated for  
10 sometimes months, and it is the value of those services that  
11 are being negotiated.

12       **THE COURT:** Okay.

13       **DR. BURTIS:** And so I do want to just make one last point  
14 about this model because -- and I think Dr. Singer and I agree.  
15 The fundamental dispute between us or the primary dispute  
16 between us is on the pass-through rate.

17       And just to focus you on that, you can see in this slide  
18 the pass-through rate is 89.9 percent in both the actual world  
19 and the but-for world. And that, too, is an average,  
20 Your Honor. And it is used throughout Dr. Singer's models.

21       **THE COURT:** Well, let me ask you this: How many  
22 developers did not pay 30 percent as a percentage?

23       **DR. BURTIS:** I don't know if I have that number.

24       So in Exhibit 8, what I have is a list of developers who  
25 are -- who are getting these deals, the special deals.

1           In addition to those, any developer who has subscriptions,  
2           they will get a lower rate on every subscription that is more  
3           than a year old. And right now, I don't know exact- -- I don't  
4           know that I have that number in my report, like how many  
5           developers there are.

6           **THE COURT:** Well, I mean, is it your understanding that  
7           most developers pay the 30 percent and some get a discount, or  
8           is it vice versa?

9           **DR. BURTIS:** Oh, no. Most -- more than most pay  
10          30 percent, Your Honor, because, again, the idea or the feature  
11          of this marketplace is that there are thousands of developers;  
12          there are thousands of developers who have apps with consumer  
13          spend. Right? And those are the developers that we're talking  
14          about who pay the service fee.

15          And the distribution of those developers is very uneven.  
16          You have this long tail of developers who are very, very small;  
17          and then you have, you know, a very small number of developers  
18          who are very, very big, who generate hundreds of millions of  
19          dollars in consumer spend every year.

20          And so those are the developers, of course, with the  
21          really popular apps and who are able -- some of those  
22          developers are able to sway the consumers from one store to the  
23          other.

24          So, but all of those small developers, the tail of  
25          developers, are paying 30 percent. Or at least, I should say,

1 they did pay 30 percent until last July, about a year ago. And  
2 Google reduced the service fee rate to 15 percent on the first  
3 \$1 million of consumer spend. And when they did that, it's  
4 like 97 percent, or some number like that, of developers are  
5 now paying 15 percent because, of course, they don't earn a  
6 million dollars.

7 **THE COURT:** Okay. Pass-through rate, you were about to  
8 say something about that.

9 **DR. BURTIS:** Well, I just wanted to --

10 **THE COURT:** First, what does that 89.9 percent -- what  
11 does that represent?

12 **DR. BURTIS:** So the way that this works, and the way that  
13 it works within the context of the plaintiffs' claims here, is  
14 that the plaintiffs are claiming that this service fee rate is  
15 too high and that in the but-for world, it would be lower. And  
16 the developers are the ones who pay that service fee. Right?  
17 And then the developers set prices. They set the prices of the  
18 apps and these in-app purchases and subscriptions.

19 And the question is: When the developers get a lower  
20 service fee rate, do they pass it through to the consumers in  
21 lower prices?

22 And in Dr. Singer's model here, he uses 89.9 percent as  
23 the average pass-through rate. So --

24 **THE COURT:** All right. So one way of looking at it is,  
25 for every dollar in service fees, the developer is having the

1 consumer pay 89.9 cents of it.

2 **DR. BURTIS:** I would say every dollar in savings --  
3 right? -- between the actual and the but-for world,  
4 89.9 percent of it gets passed through to the consumers in  
5 lower prices.

6 **THE COURT:** All right. Okay.

7 **DR. SINGER:** Your Honor, is it okay if I respond to a few  
8 things that she said?

9 **THE COURT:** Okay. I don't want to derail her too much,  
10 but go ahead. And Dr. Burtis can certainly do the same.

11 **DR. BURTIS:** No, that's fine. I'm done.

12 **DR. SINGER:** And I'll make it very, very quick, I hope;  
13 and then we can go to the next point, which is the  
14 Landes-Posner model for the in-app aftermarket services.

15 Just four very quick points. She said that every -- every  
16 input into the model is an average or an aggregate. I just  
17 want to point out that's not quite true.

18 The marginal cost is a key input to the model. And the  
19 marginal cost -- this is Google's marginal cost for operating  
20 the store, which I've estimated to be between 7 and 10 percent,  
21 depending on which cost of revenues, depending on which cost  
22 you include. I wouldn't call that an average marginal cost. I  
23 wouldn't call that an aggregate. It's just Google's marginal  
24 cost, just an input to the model.

25 I will grant you that the pass-through rate that I use to

1 come up with the but-for headline take rate is the average  
2 across all the individual Google categories over which I  
3 estimated a pass-through as a preview of the pass-through  
4 debate. But as you may or may not know, I have  
5 category-specific pass-through rates.

6 But when I go to project a but-for take rate that's going  
7 to mimic this kind of singular uniform but-for rate that Google  
8 uses in the actual world, I need it to spit out one number. So  
9 I can't put in every individual pass-through rate by category.  
10 I put in the average pass-through rate.

11 **THE COURT:** We do this all the time. There's nothing  
12 wrong with an average. I mean --

13 **DR. SINGER:** No, I don't have a problem with that. Just,  
14 in this model, in this circumstance, it's calling for an  
15 average. I have --

16 **THE COURT:** Unless Dr. Burtis says the average is  
17 misleading because the range is so huge, it's a number that  
18 doesn't really exist anywhere.

19 Is that your --

20 **DR. BURTIS:** Yeah, that's it. That would be --

21 **THE COURT:** And why is that?

22 **DR. BURTIS:** -- a good guess.

23 **THE COURT:** I can't imagine Google has that many options  
24 that it gives to people.

25 **DR. BURTIS:** Oh, but this is the pass-through rate.

1       **THE COURT:** No, no. For example, that 3.99 product price  
2 rate, you said that was a misleading average. But why is that?

3       **DR. BURTIS:** Well, the 3.99 is the developer's price, the  
4 developer's price of an app. And apps can be --

5       **THE COURT:** It's an average. It's Dr. Singer's average  
6 for that.

7       **DR. BURTIS:** Yes.

8       **THE COURT:** Yeah.

9       **DR. BURTIS:** And, I mean, apps are -- the prices of apps  
10 are highly variable. But --

11       **THE COURT:** I don't have a problem with that. But what's  
12 wrong with using an average, even if they're highly variable?

13       **DR. BURTIS:** So in general, the -- I'm going to -- I'll  
14 use the pass-through rate as my example here and not the price,  
15 because it matters.

16       The question is: If you use an average, is there -- as  
17 you put it; right? -- is there so substantial variation  
18 underneath that average that you can't get the conclusions that  
19 you need to get? Do you need to go more into the data to  
20 really understand what the conclusion of the analysis is?

21       So Dr. Singer has a pass-through rate of 89.9 percent.  
22 Even his estimates, you know, when he does these individual  
23 pass-through rates, vary from, like -- I don't have his in  
24 front of me, but it's like 26 percent to 99.99 percent. Okay?

25       Mine, the pass-through rates that I have found using data,

1 many, many of those pass-through rates are zero. And so using  
2 an average in this particular -- for this particular input will  
3 generate much -- substantively different results, depending on  
4 which of those numbers you put into the model.

5 **THE COURT:** All right. So let's go with that. That  
6 doesn't mean the model itself is so flawed that nobody would --  
7 no reasonable economist would use it. I mean, you don't like  
8 the inputs. That's perfectly fine. That would be something  
9 for the trier of fact to take into account, were the inputs  
10 accurate or not. But as a concept, a couple higher levels, the  
11 model itself is okay. Is that fair?

12 **DR. BURTIS:** As I said, the model exists in the  
13 literature; and I'm not here to say that this is a model that  
14 nobody uses. I won't say that about this model. Whether it's  
15 the right model, I don't know, and I don't have an opinion.

16 But I guess my overall point is it is a model that can  
17 only return one answer for everybody. Either everybody's  
18 impacted or everybody's not.

19 **THE COURT:** I'm trying to figure out why, as a practical  
20 matter in an antitrust case, why is that a problem? If Google  
21 has a 30 percent number -- I know you disagree with how widely  
22 that's used. But it looked to me like there was a fair amount  
23 of evidence that 30 percent is a number that Google used  
24 internally and externally. So what's wrong with saying, "Well,  
25 it should have been 15, not 30"?



1       **DR. BURTIS:** So, Your Honor, for example, I know that,  
2 you know, in the broader landscape of this litigation, there  
3 are individual developers who are bringing claims against  
4 Google and they might want to use this model; but if they use  
5 this model, they're going to come and they're going to have  
6 their own set of inputs. And their -- and, you know, the fight  
7 will be about: Well, is that input the right input?

8       And conceivably, you know, if you have a bunch of big  
9 developers, they could have -- each one of them could have  
10 their own model. You know, I don't know that it's necessarily  
11 going to be this one; but if it's this type of model, then it's  
12 going to be different for different developers.

13       **THE COURT:** Okay. But we're looking at a class now, a  
14 putative class. Whether it gets certified or not, we shall  
15 see.

16       But as a technique for a putative class, what, in your  
17 view, is fundamentally junk science -- because that's sort of  
18 the buzzword test -- about coming up with one but-for  
19 pass-through rate for the class?

20       **DR. BURTIS:** Well, that one's -- that's a big question,  
21 Your Honor. So I thought you were going to ask me about the  
22 model, and now you're going to ask me about pass-through rate.  
23 So the pass-through rate is a much larger discussion. And if  
24 we want to talk about that, I can, and the methodology that is  
25 used to generate that.

1       Regarding this model, I would say, I don't think this  
2       model itself is junk science. I wouldn't say that. All I'm  
3       saying here is that, you know, Dr. Singer, he didn't try to  
4       adapt the model, to really test the issue of common impact  
5       here. He didn't do anything to test. And the way that I think  
6       about what we're doing at this stage of the litigation is, we  
7       have to answer that question. Can we make the assumption that  
8       there's a single model with a single set of inputs that fairly  
9       represents all these developers?

10       That's what he should have done, but he didn't. He just  
11       said: You know what? Here's the model. I'm going to use all  
12       these averages, and I get a result and it applies to everybody.

13       And so I think, when you do these things, that there's  
14       something that precedes using a model like this that is all  
15       built on averages, and that analysis is missing.

16       **THE COURT:** What is that? What analysis is missing?

17       **DR. BURTIS:** Well, we could talk about pass-through rate.  
18       Right? Should we put in one pass-through rate? And we can  
19       talk about that, because that's a large discussion.

20       **THE COURT:** That's what I'm asking.

21       **DR. BURTIS:** Yes. Yeah.

22       **THE COURT:** Okay. So let me just try it again.

23       There is evidence in the record that Google itself has a  
24       30 percent number -- okay? -- for everybody. It gets tailored  
25       over time. You can have different deals. But when you walk

1 into the Google restaurant, the price on the menu is  
2 30 percent, and you can have a conversation with your server at  
3 that point about whether you're going to get a special deal.

4 What is wrong about -- I'm just not following why you  
5 think it's so fundamentally wrong for a but-for model to have a  
6 single starting point number as well.

7 **DR. BURTIS:** Because it is the way that competition takes  
8 place in this industry. Because the way that these app stores  
9 compete with one another -- and it's not just Google, but it's  
10 Samsung and Amazon -- they don't reduce their service fee rates  
11 across the board. You know, what they do is they say: Oh,  
12 here's a really important set of developers, and we need those  
13 developers to stay on or to get on our App Store, and so we are  
14 going to give them -- we're going to compete for them.

15 And so the plaintiffs' allegation is here: In the but-for  
16 world, there would be more competition. Well, okay. How would  
17 that competition work? It would work the same way that it does  
18 in the actual world. These app stores would go after those  
19 developers. There wouldn't be a reduction in the service fee  
20 rate from whatever it is now to what Dr. Singer has found with  
21 one of his models. That's just not the way that it works in  
22 the actual world.

23 **THE COURT:** Well, how does it work, in your view?

24 **DR. BURTIS:** It works the way that I was trying to  
25 describe. Google says: Oh -- or Samsung.

1       Like, Samsung, for example, Epic was a really -- you know,  
2       it was a big deal to get Epic in their store. So they offered  
3       them a special deal. When Amazon was competing for developers,  
4       they went out -- they wanted game developers because the game  
5       developers have a lot of consumers; and so Amazon went after a  
6       small set of game developers with really popular game apps.  
7       And so that's the way these stores compete with one another.

8       And so if you say, "Well, there's going to be more  
9       competition in the but-for world," well, there's going to be  
10      more of that.

11      **THE COURT:** Well, okay. I thought I had asked you whether  
12      you knew how many developers were off of the 30 percent rate.  
13      I think you answered you didn't know.

14      So the fact that there may be an Epic here and there, why  
15      does that fundamentally throw off the idea that you can have a  
16      uniform number for class purposes?

17      **DR. BURTIS:** So, I'm sorry. Are you asking me does it  
18      matter how many there are?

19      **THE COURT:** If you don't know how many people get a  
20      non-30 percent rate, how can -- your argument seems to be: Oh,  
21      there's so much individualized negotiation. But what I hear  
22      you also saying is you don't know how much individualized  
23      negotiation there actually is.

24      So I understand that -- look, in every case, every  
25      price-fixing case, every Section 2 case, every Section 7 case,

1 there are variables. There is no -- I have never seen an  
2 antitrust case where everybody in a class was treated exactly  
3 the same way. And that's okay. We don't need that.  
4 Otherwise, you'd never have a class certified.

5 We just need a reasonable method that would allow me to  
6 decide whether or not the antitrust injury for the consumers is  
7 something I can determine on a class-wide basis reasonably.  
8 Not with the precision of splitting an atom; just reasonably.

9 And I'm still not -- and, okay. I understand some big  
10 players get sweet deals. They're not going to pay 30 percent.  
11 They might pay 10 or 15 or something. Or they might have  
12 ladders: first 5 million is 30, next 5 million is 10.

13 But how does that derail Dr. Singer's fundamental  
14 proposition that there is at least one number that reasonably  
15 fits the class?

16 **DR. BURTIS:** Well, I would say, Your Honor, that,  
17 you know, if -- what you're describing is that there are really  
18 big differences between -- even if it's a small number of  
19 large, important customers and a large number of very small  
20 customers. And to the extent there are those fundamental  
21 differences, then we should separate them and treat them  
22 differently.

23 **DR. SINGER:** May I just weigh in very quickly?

24 **THE COURT:** Sure.

25 **DR. SINGER:** Then we can change and go to the next topic.

1       **THE COURT:** Yes.

2       **DR. SINGER:** We've got to get down the line.

3       I just want to say two things left, back to what  
4       Dr. Burtis said.

5       One, she made a point about that the model, you know, you  
6       put in a different but-for market share and the but-for  
7       headline rate changes. Of course it does. She didn't say it  
8       changes severely because she couldn't. Right?

9       So I think the best estimate that I can go out and find in  
10      the literature for the but-for headline market share in a world  
11      in which Google refrains from the restraints that it used to  
12      end competition in the app distribution market was to look at  
13      how much share loss AT&T suffered after its tie was broken  
14      between local access and long distance telephony. That turned  
15      out to be 60 percent. In other words, I allow Google to  
16      maintain a 60 percent share of all transactions in the but-for  
17      world.

18      But if I'm wrong and Dr. Burtis thinks that I'm being too  
19      aggressive and the right number should be 70 percent, you could  
20      put the number 70 percent in the Rochet-Tirole model and it  
21      would generate a slightly different but-for take rate.

22      But that's a fight about the inputs. I don't hear that as  
23      being an issue that implicates individualized analysis. It's  
24      all done using common methods and common evidence.

25      I'd like to make just one last point. Then we can move

1 on, if that's okay. You asked her for the --

2 **THE COURT:** The issue is, your common approach is gliding  
3 over glaring disparate -- disparately situated developers. And  
4 how are you going to assure me that that's not the case?

5 **DR. SINGER:** Right. It's not because the deviations from  
6 the headline rate in the actual are so limited.

7 Dr. Burtis studies three examples of discounts. Right?  
8 One of them is that LRAP program, L-R-A-P, Living Room  
9 Accelerator. 50, 50 developers in that. Okay? Of all the  
10 hundreds of thousands of developers, there were 50.

11 The next experiment she examines is the subscription  
12 experiment. And there were a lot of subscription -- there were  
13 a bunch of developers that have subscription products. But  
14 everybody who has a subscription product -- if you or I came up  
15 with a subscription app, we would be eligible for the  
16 15 percent take rate in Year 2 if our customers hung around for  
17 two years. No individualized.

18 And the third thing she studies, I think, is the  
19 million-dollar -- you know, the first million dollars for small  
20 businesses. All that applies commonly. There's no individual  
21 negotiation there.

22 And if it's okay, those are the only --

23 **THE COURT:** Well, let me ask you --

24 **DR. SINGER:** Yes. Oh, you wanted a number. A number  
25 roughly?

1       **THE COURT:** No. Just, where in your report do you look at  
2 the deviation from the headline rate?

3       **DR. SINGER:** Oh. What I do is, in each app category --  
4 Your Honor, I believe it's Tables 13 and 14 -- I have  
5 calculated what every developer, by category, was able to  
6 secure in the actual world off the headline rate of 30 percent.  
7 And if the set of developers --

8       **THE COURT:** 13 and 14?

9       **DR. SINGER:** Yes. Those are my damages by -- I'm doing  
10 this by memory, but Singer initial report, 13 and 14, shows  
11 damages first in the app distribution market by category.

12       **THE COURT:** I'm not seeing -- what page is that on? This  
13 is your initial report; right?

14       **DR. SINGER:** Yes. If it's not 13 and 14, it's 14 and 15.  
15 It's pretty late in the report.

16       I'll pause while we find it. Is it important?

17       **THE COURT:** Yes, this matters to me. I'd like to --

18       **DR. SINGER:** Yes. It was Table 13, page 133, Your Honor.

19       **THE COURT:** Oh, 133. Okay. All right.

20       All right. So what is Table 13 showing?

21       **DR. SINGER:** Table 13 is showing how to arrive at  
22 aggregate damages by app category.

23       And your question, if I recall it correctly, is: How did  
24 I take into consideration the discounts that were actually  
25 achieved in the -- that were achieved in the actual world off



1 the headline rate, and how did I project those in the but-for  
2 world?

3 So if you look at the column that's titled "Actual Take  
4 Rate," you can see there is some variation. Not much. I think  
5 Table 14 might be more illustrative.

6 Let's look at Table 14, if that's okay. Table 14 is on  
7 page 134. You'll see there is some variation. You'll see that  
8 Music and Audio got a big discount off the actual take rate for  
9 in-app purchases. You see that, Your Honor, the 19.1 percent?

10 **THE COURT:** Let's just go -- I'm more interested in 13.  
11 This is the Google Play market; right?

12 **DR. SINGER:** That's the primary market. That's correct.

13 **THE COURT:** Let's look at that one first.

14 **DR. SINGER:** That's fine.

15 **THE COURT:** All right. There's actual take rate. Tiny  
16 variations. What does that mean?

17 **DR. SINGER:** That means there was almost no deviation,  
18 almost no transactions that occurred off the 30 percent default  
19 headline rate in the primary market for app distribution.

20 **THE COURT:** And how did you -- let's just pick Food and  
21 Drink, 29.9 percent.

22 **DR. SINGER:** Right. So I can go into the database,  
23 Your Honor, and for each transaction in the database, I get to  
24 see the take rate, the applicable take rate that was paid by  
25 the developer on that transaction.

1       **THE COURT:** Actual pays?

2       **DR. SINGER:** The actual take rate. That's correct.

3       And so you'll see there's not much variation -- I'm  
4       looking at Table 13. There's not much deviation from the  
5       30 percent, which I think just makes my point that --

6       **THE COURT:** That would account for individual deals and --

7       **DR. SINGER:** That accounts for all individual deals.

8       If you go to Table 14, you'll see. Some --

9       **THE COURT:** No. I like 13.

10      **DR. SINGER:** I was trying to help Dr. Burtis.

11      **THE COURT:** All right. So that is your way of -- you  
12      actually tested using Google's actual developer fee contracts  
13      and agreements?

14      **DR. SINGER:** I'm looking at the transaction data. I don't  
15      have to look at the agreements. I have the transaction data  
16      which shows me the actual discounts that were secured. And  
17      this is my --

18      **THE COURT:** That would account for every individualized  
19      deal?

20      **DR. SINGER:** Correct. And there weren't that many of  
21      them. And this is key.

22      **THE COURT:** Dr. Burtis, that looks pretty good. What's  
23      wrong with that?

24      **DR. BURTIS:** So, well, it doesn't account for everything  
25      because it doesn't account for the individualized deals where

1 they're negotiating the services, but that is a small number of  
2 developers.

3 **THE COURT:** Dr. Singer, I think, just said it did. So --

4 **DR. BURTIS:** It does not.

5 **THE COURT:** Why is that?

6 **DR. BURTIS:** Because it just doesn't. In the transactions  
7 data, that's just not there.

8 **THE COURT:** Well, "It just doesn't" doesn't help me.

9 Food and Drink, Dr. Singer is saying he looked at every  
10 service fee agreement in the Food and Drink app category, every  
11 one.

12 **DR. BURTIS:** So --

13 **DR. SINGER:** Every transaction.

14 **THE COURT:** What did he leave out?

15 **DR. BURTIS:** So --

16 **THE COURT:** How could he have missed anything?

17 **DR. BURTIS:** If he is looking at the service fee rates in  
18 the transactions data and he did it right, then that would be  
19 correct.

20 But you asked him the question about the individualized  
21 deals. And all I'm saying is that there are some of those  
22 deals, and you are not going to see the effects of those deals  
23 by looking at the service fee rate because what they're doing  
24 is they're negotiating for services. You know, they want  
25 certain things from Google. They're not going to have a

1 different rate. They're going to have more, you know,  
2 something. More -- I won't say it out loud but --

3 **THE COURT:** All I care about is the rate. I mean, what --

4 **DR. BURTIS:** Okay. I mean --

5 **THE COURT:** Well, it's not "okay." This case is about the  
6 rate. What difference does it make whether they got a  
7 complimentary doormat because they paid a high rate? I mean,  
8 they're still paying the rate. I don't really understand what  
9 you're saying.

10 **DR. BURTIS:** Well, I would say it is the way that Google  
11 has competed. And so in the but-for world, if there's more  
12 competition, then Google would compete more like it did in the  
13 actual world, and so you'd have to take account of that other  
14 way of competing.

15 **THE COURT:** Well, let me -- okay. Just looking at that  
16 Table 13 in Dr. Singer's opening report -- and I'm looking at  
17 Docket Number 254-4, which, unfortunately, is sealed, at least  
18 for the moment -- I'm not hearing anything from you,  
19 Dr. Burtis, that tells me that the actual take rate number for  
20 each of those categories of apps is underinclusive in any way.  
21 In other words, I'm not hearing you say that any rate actually  
22 paid by a developer in one of those app categories was not  
23 included. Is that right? You're not saying that they --  
24 anything was omitted.

25 **DR. BURTIS:** Well, how far did you go in your data?

1       **DR. SINGER:** This has every transaction during the class  
2 period.

3       **DR. BURTIS:** All the way through 2021?

4       **DR. SINGER:** Yes.

5       **DR. BURTIS:** So you're showing everybody who got a lower  
6 rate in July of 2021? Because --

7       **DR. SINGER:** No, no, no. Across the entire class period.

8       Just to be clear, any discount that you got -- any  
9 discount that you got in the actual world -- right? -- from the  
10 headline take rate was applied in the but-for world from a  
11 lower headline take rate -- right? -- assuming that Google  
12 refrained from engaging in the challenged conduct.

13       **DR. BURTIS:** So, Your Honor, if you look at my Figure 4,  
14 you can see it by year.

15       **THE COURT:** Which one?

16       **DR. BURTIS:** Figure 4.

17       **THE COURT:** In your report?

18       **DR. BURTIS:** Yes. It's on page 44.

19       And you can see that over time, the share of the  
20 developers -- this is the U.S. developers, the class of  
21 U.S. developers. You can see that that share fell over time.

22       **THE COURT:** The service fee rate?

23       **DR. BURTIS:** The share of developers who were getting the  
24 30 percent rate.

25       **THE COURT:** Oh, I'm sorry. Figure 4, you said.

1       **DR. BURTIS:** Yes.

2       **THE COURT:** Okay. Page 45. Okay.

3       Okay. So what does that have to say about the  
4       completeness of the data used in Table 13 in Dr. Singer's  
5       report?

6       **DR. BURTIS:** Well, you know, I didn't check his Table 13.  
7       They should be -- if -- you know, I use this transactions data  
8       to do this too; so they should be the same.

9       **DR. SINGER:** I'm happy to move on to 1(b), the take rate  
10      for the in-app transactions, if you'd like; or if you'd like to  
11      skip right to pass-through --

12      **THE COURT:** Well, I just --

13      **DR. SINGER:** Oh, sorry. I didn't know --

14      **THE COURT:** Table 13, I just want to be crystal clear  
15      about this. So you're saying, Dr. Singer -- and you can  
16      correct me if I misunderstood -- but the actual take rate in  
17      Table 13, and I guess also for Table 14, same column, accounts  
18      for every service fee agreement in each of those app categories  
19      for the time period that you had the data?

20      **DR. SINGER:** It does, Your Honor.

21      And I just want to make sure. You're using the word  
22      "agreement." I didn't study the agreements. You probably  
23      don't want me to be reading agreements. I have the transaction  
24      data.

25      **THE COURT:** That's what I mean.

1       **DR. SINGER:** Yes.

2       **THE COURT:** The actual --

3       **DR. SINGER:** Transactions.

4       **THE COURT:** The actual charge --

5       **DR. SINGER:** Yes.

6       **THE COURT:** -- from Google to the developer?

7       **DR. SINGER:** Correct. Every one.

8       **THE COURT:** So the variation is quite slight?

9       **DR. SINGER:** It's quite slight in that initial app  
10 distribution market; that is correct.

11       You see a little more variation in Table 14. I don't know  
12 why I'm so excited to take you there. But you see a little  
13 more variation in Table 14, and we can talk about --

14       **THE COURT:** Even taking Dr. Burtis's comment that there  
15 were some heavyweights, so to speak, who got special deals,  
16 once they're all aggregated, the effect is quite tiny in terms  
17 of getting off the 30 percent rate?

18       **DR. SINGER:** In the app distribution market, that is true.  
19 That's not necessarily the case when we go to in-app. But  
20 whatever discounts a category was able to secure, those same  
21 discounts off a lower headline rate were applied in the but-for  
22 world.

23       **THE COURT:** Just last chance, Dr. Burtis.

24       **DR. BURTIS:** I'm good. I'm good, Your Honor. I'm happy  
25 to move on.

1       **THE COURT:** Nothing to say about that?

2       **DR. BURTIS:** It is not part of our central dispute. So  
3 I'm happy to move on.

4       **THE COURT:** Okay. 1(b).

5       **DR. SINGER:** Excellent. And I'll make this quick and  
6 painless, I hope.

7       So this is -- you're going to see a lot of symmetry here.  
8 I just have three points for how I estimated the but-for take  
9 rate for in-app services.

10       So Point Number 1, I use a classic model from the  
11 literature, the Landes-Posner model, which is generally  
12 accepted and fits the facts of the case.

13       Now, unlike app distribution, where Google was playing the  
14 role of a matchmaker, the aftermarket for in-app services is a  
15 one-sided market between developers on the one hand and  
16 suppliers of these aftermarket services on the other, with no  
17 indirect network effects. It is a simple transaction between  
18 the buyer, which is the developer, and a seller of the  
19 aftermarket services and includes things such as payment  
20 processing, recordkeeping, and unlocking of content needed to  
21 consummate a purchase of in-app content through the app.

22       Now, given the lack of indirect network effects, we need a  
23 one-sided model to reflect the one-sided nature of the  
24 aftermarket for in-app services.

25       And there's good news here as well, Your Honor, in that we



1 have two famous antitrust scholars, William Landis and Judge  
2 Richard Posner, who have derived how a dominant firm changes  
3 its prices in response to entry by -- this is a technical  
4 term -- a competent fringe, or just by a new set of entrants  
5 that hadn't been there, now upsetting the dominant firm's  
6 monopoly. They have derived a model. It's very common and  
7 classic in the literature that economists use for these sorts  
8 of situations.

9 Point Number 2, the Landes-Posner model employs real-world  
10 data from this case.

11 If I could put up Slide 3, Your Honor, it's going to look  
12 just like the slide for the Tirole model, but now we're looking  
13 at the Landes-Posner, what went into estimating the but-for  
14 take rate for in-app services.

15 Do we have that up? One down. You're on Rochet-Tirole.  
16 Can you come down to Posner? There you go. Thank you so much.

17 So armed with the right model, we now have to provide  
18 inputs to the model and determine changes in the price for  
19 in-app aftermarket services.

20 And this is where Dr. Burtis and I get into a similar  
21 dispute from what he just had. She takes issue with my  
22 pass-through, which, again, is an input; but we're having an  
23 entire debate over pass-through --

24 **THE COURT:** To start, what does that 29.2 percent take  
25 rate mean?

1       **DR. SINGER:** This is the actual -- this is the actual take  
2 rate -- sorry. Which -- I don't see it in front of me. Let me  
3 come over here.

4       **THE COURT:** Your columns are redacted. The third thing  
5 down.

6       **DR. BURTIS:** It's the actual service fee rate on average.

7       **THE COURT:** Sorry?

8       **DR. BURTIS:** It's the average. It's the average service  
9 fee rate for in-app purchases.

10       **THE COURT:** I know, but what does that mean? Who's paying  
11 what to whom --

12       **DR. SINGER:** Oh.

13       **THE COURT:** -- in that 29.2 percent?

14       **DR. SINGER:** Yes. That is what developers pay, on  
15 average, to transact in these in-app aftermarket transactions  
16 to Google. That is, Google is taking 29.3, on average, of the  
17 revenue -- right? -- away from the developer and pocketing it.  
18 Right? That's what the 29.3 stands for.

19       **THE COURT:** For billing services or whatever?

20       **DR. SINGER:** Well, a few more things. Yes, a few more  
21 things. I went through that list of recordkeeping, payment  
22 processor. And, you know, give you an idea, the competitive  
23 rate -- you saw this in my report, Your Honor -- for payment  
24 processing is between about 2 and 4 percent.

25       May I go on?

1       **THE COURT:** Yeah, please.

2       **DR. SINGER:** Okay. All right. Now, here, too, I use all  
3 of the real-world data available to me. Just an example of  
4 some of the rows, consumer expenditures on in-app products and  
5 Google's revenues were obtained from Google's financial and  
6 transaction data. And the table shows how I calibrated the  
7 model based on the real-world data to get the but-for rate for  
8 this in-app aftermarket. Okay?

9       Point Number 3, other than suggesting it can't be used  
10 marketwide, Dr. Burtis, again, largely gives the Landes-Posner  
11 model a pass. She doesn't dispute that Landes-Posner is  
12 standard or that it's widely accepted in the literature. She,  
13 again, complains that I performed a marketwide analysis rather  
14 than solving for hundreds or thousands of but-for headline take  
15 rates again. And she's wrong for similar reasons that I think  
16 we just went through for app distribution.

17       Again, Google doesn't negotiate take rates for in-app  
18 support services individually with tens of thousands of app  
19 developers. It would make zero economic sense. That's all  
20 they'd be doing all day if that's what they did.

21       The second point --

22       **THE COURT:** Well, in Table 14, the take rate -- actual  
23 take rate is much more variable.

24       **DR. SINGER:** It is. And so I can go to some examples.  
25 Like in the music category, Your Honor, on Table 14, you'll see

1 that those developers did very well at securing a discount,  
2 19.1 percent, on average.

3 I think we have some --

4 **THE COURT:** Why is a uniform number, then, going to be  
5 useful in this --

6 **DR. SINGER:** Because in the but-for world, the discount  
7 that these big guys, like Pandora, were able to achieve would  
8 be achieved off of a lower but-for headline rate. We still  
9 need a model to produce for us a singular but-for headline  
10 rate. From that lower rate, we then can allow for some  
11 individual prices or variation by categories to replicate the  
12 kind of discounts that were secured in the actual world.

13 But what the model is going to give us is a singular  
14 headline rate that would serve, just like in the actual world,  
15 as a starting point for all negotiations.

16 **THE COURT:** Dr. Burtis, what's wrong with that?

17 **DR. BURTIS:** You know, I would say the same thing,  
18 basically, Your Honor.

19 **THE COURT:** Okay. I mean, just to break that down a  
20 little bit, you don't take issue with the Landes-Posner model  
21 as a model for the case; is that right?

22 **DR. BURTIS:** Economists use this -- these kinds of  
23 equations. I certainly wouldn't say that this is, you know,  
24 junk science in that regard. I think the issue for me is  
25 whether this model is capable of answering the question of

1 whether all of those rates would really fall in the but-for  
2 world. And, you know, it is a model that doesn't provide us  
3 with the opportunity to really determine that question. It  
4 just --

5 **THE COURT:** But why? I know that's your position. But  
6 why?

7 **DR. BURTIS:** You mean why would it be possible that not  
8 all the rates --

9 **THE COURT:** Why do you tell me that this won't work? What  
10 you just said, why is that the case?

11 **DR. BURTIS:** Oh, because it's the mechanics of the model,  
12 Your Honor. I mean, you only get one answer out of this model.  
13 You get -- you either get a reduction or you don't get a  
14 reduction. So there's -- the model doesn't give us the  
15 opportunity to answer the question: Is it possible that  
16 somebody's not impacted?

17 **THE COURT:** Okay. But does the data show that --  
18 anything's possible, but you've got to look at the data in the  
19 world as it is today. Did you find anything in the data of the  
20 world that says your concern has some teeth to it? In other  
21 words, it has to be more than just economic abstraction. You  
22 have to say this model doesn't fit the actual data we have.

23 Do you have that?

24 **DR. BURTIS:** Yes. And in my report, I talk about the way  
25 that these app stores compete and the way that they compete for

1 individual developers. And so, in my view, in the but-for  
2 world, there would be -- even with more competition, even if we  
3 assume, in the but-for world, Google has more competition, if  
4 we also believe that that competition is going to manifest  
5 itself the same way that it does in the actual world, there  
6 will be developers who will not get a lower service fee rate.

7 **THE COURT:** Okay. I don't have a problem with that. But  
8 why does that mean you have to throw out everything Dr. Singer  
9 did?

10 **DR. BURTIS:** Because his model doesn't allow for that  
11 possibility. He -- he -- you know, it's --

12 **THE COURT:** Let me struggle to put it differently, if I  
13 just might jump in. Okay? But what is the weight of that? I  
14 mean, if his model doesn't allow it but it has a 5 percent  
15 impact, that's okay. If his model doesn't allow it but it  
16 throws off the numbers by 55 percent, that would be an issue.

17 So we're not looking for perfection. This is an antitrust  
18 case in a United States District Court. So I'm trying to  
19 figure out, in the messy world of apps and consumers and  
20 developers and platforms -- we're not looking for an artificial  
21 uniformity or singularity. If it doesn't exist in the real  
22 world, we're not going to demand one in a model.

23 So it may be -- I mean, did you quantify how much of  
24 this -- what is the weight or the impact on Dr. Singer's model?  
25 I mean, is it so bad that it's throwing out all the data, or is

1 it just a couple of things here and there are not getting  
2 picked up?

3 **DR. BURTIS:** So I guess -- so I did not try to develop an  
4 alternative model that I could use.

5 **THE COURT:** I'm not asking you that.

6 **DR. BURTIS:** Okay.

7 **THE COURT:** I'm asking you to pick apart your colleague  
8 here. Just tell me why he's wrong.

9 And I understand some things may be missing. I'm trying  
10 to get a sense of the gravity of that. All right? I'm okay --  
11 I'll just be candid. I'm okay if a few things are missing and  
12 it doesn't -- it's a tenth of a percentage point. I'm just  
13 using this as illustrations. I'm not okay if a few things are  
14 missing or some things are missing and it's a 50 percent -- the  
15 target's off by 50 percent. I'm not hearing where you are on  
16 that; so help me understand.

17 **DR. BURTIS:** So I would say, Your Honor, the -- so the  
18 magnitude issue is more like a damages issue. I think that  
19 that's the kind of the question that you're asking me. Like,  
20 how bad is this model in terms of the damages? And, you know,  
21 I think that depends on who this model doesn't fit.

22 If it turns out that it doesn't fit the small developers,  
23 well, they're small -- right? -- and so the difference in the  
24 damages will be small; but if this model doesn't fit, you know,  
25 the top ten developers, then that's huge because those top --

1       **THE COURT:** I'm asking you, just to jump in, you keep  
2 saying "if." Does this fit it or not? I need your opinion. I  
3 mean, I understand there are lots of "ifs," but what is your  
4 conclusion? Does Dr. Singer's model actually fit the small  
5 developers, the whale developers, or does it not? That's what  
6 I'm trying to understand.

7       **DR. BURTIS:** I think it would -- well, again, I would like  
8 to move to the issue of pass-through because I think --

9       **THE COURT:** Let's answer my question first. Okay?

10       **DR. BURTIS:** Well, if we -- if we -- it wouldn't fit a lot  
11 of developers. It would be a big deal because, in my view,  
12 that pass-through number is very wrong.

13       **THE COURT:** All right. Well, did you quantify how many --

14       **DR. BURTIS:** Yes.

15       **THE COURT:** Where is --

16       **DR. BURTIS:** There's all kinds of -- not in this model,  
17 but I quantified the issue with regard to pass-through.

18       **THE COURT:** Okay. All right. Well, all right. If you  
19 want to do it that way, that's fine. Go ahead.

20       **DR. SINGER:** Your Honor, I had one more point for --

21       **THE COURT:** I want to hear the pass-through.

22       **DR. SINGER:** Oh, I'm sorry.

23       **DR. BURTIS:** Oh, you want to go to pass-through?

24       **THE COURT:** Yes.

25       **DR. SINGER:** I think I was designated as the presenter of



1 the pass-through, since it's my model.

2 **THE COURT:** Well, I think I get it.

3 What's your -- just go ahead, yeah.

4 **DR. BURTIS:** All right. So I'm going to -- I'm going to  
5 sort of jump to something sort of to the end. Okay? But it is  
6 addressed in this.

7 So I want to go to my Slide 14.

8 **THE COURT:** 14. All right. What page is that?

9 **DR. BURTIS:** I only have slides. It's a slide.

10 **THE COURT:** Oh, it's a slide? Oh, okay. Sorry.

11 **DR. BURTIS:** Yeah.

12 **THE COURT:** This thing you handed -- okay. All right.

13 **DR. BURTIS:** Okay. So we can talk -- and we should -- we  
14 should talk about the methodology that Dr. Singer used to find  
15 the pass-through rate that he uses in his models, and he  
16 also -- he also uses that in his damage model.

17 And just stepping back for a minute, Your Honor, the  
18 models that we were looking at are -- Dr. Singer uses those to  
19 find the but-for service fee rate. Right? And so the ultimate  
20 question, though, for these consumers is: Even if that service  
21 fee rate was lower, did the developers pass those lower service  
22 fee rates on to consumers in lower prices?

23 And so he not only uses the pass-through rate in that  
24 model, but he uses the pass-through rate to answer that  
25 fundamental question. So it's a really important issue, and

1 this is a big, I think, dispute between us. Okay? So I can  
2 talk about his methodology, or -- I'll give you a brief --  
3 well, I don't know how to do this because it's long. Do you  
4 want me to?

5 **THE COURT:** Whatever you'd like. I'll tell you what,  
6 though. Let's take a -- we can take about a ten-minute break  
7 and give the court reporter an opportunity to cool her hands  
8 off. So we'll start again at about 3:15.

9 **DR. BURTIS:** Okay.

10 **THE CLERK:** All rise. Court is in recess.

11 (Recess taken at 3:06 p.m.)

12 (Proceedings resumed at 3:14 p.m.)

13 **DR. BURTIS:** Okay?

14 **THE COURT:** Please.

15 **DR. BURTIS:** Okay.

16 **DR. SINGER:** Your Honor -- oh, sorry.

17 May I make a suggestion? Because we're going to be  
18 debating my logit model, the appropriateness and reliability of  
19 my logit model, I'm available, if you'd like me to go first --

20 **THE COURT:** No. We will. I just want to have Dr. Burtis  
21 round out her thought before we --

22 **DR. SINGER:** Okay.

23 **THE COURT:** -- took our break.

24 **DR. BURTIS:** Okay. Thank you, Your Honor.

25 So --

1       **THE COURT:** Looking at Table 14.

2       **DR. BURTIS:** Yes. The slide on page 14 is an exhibit that  
3 was in my report.

4       **THE COURT:** Yes.

5       **DR. BURTIS:** And we will talk about Dr. Singer's  
6 methodology and how he got his pass-through rates. I will tell  
7 you now that that is a methodology that I've never seen used  
8 before. I mean, you were asking me these questions about,  
9 you know, is this a standard methodology, about the other  
10 models. Dr. Singer's methodology for the pass-through rates is  
11 not. It is not standard. I have never seen it before.

12       Dr. Singer was asked at his deposition if he's ever used  
13 it before, and he said no, and he also said that he hasn't seen  
14 it used.

15       **THE COURT:** This is the one minus --

16       **DR. BURTIS:** Yes. One minus the share formula, correct.

17       **THE COURT:** One minus the share.

18       **DR. BURTIS:** One minus the share formula.

19       I've never seen it actually used in any article, even.  
20 So, but we can talk about that.

21       The other two bars -- and what these represent are the  
22 percentage of pass-through rates that are positive. That's  
23 what is on this graph. And so I looked at the actual data.  
24 Google did lower its service fee rate for certain developers  
25 over time during the class period.

1 I was able to look at -- I had, like, four different  
2 databases. I was able to look at over 450,000 different -- I  
3 call them "SKUs," which is either a paid app or an in-app  
4 purchase or a subscription, and I looked at all three of those  
5 different types of monetizations.

6 And what I found -- I just asked the question: Did the --  
7 did the price of that SKU fall after the service fee rate was  
8 reduced? And I found that in only 2 percent, over all of these  
9 SKUs, only 2 percent fell. And, by the way, this -- I did  
10 this --

11 **THE COURT:** Where is that in your report?

12 **DR. BURTIS:** This is actually Figure 13 in my report. So  
13 it would be -- the discussion of that is around Figure 13.

14 **THE COURT:** Okay. All right.

15 **DR. BURTIS:** And just to be clear, I did this by comparing  
16 prices one month before the service fee rate fell and one month  
17 after. I did it six months before and six months after. I  
18 also said, I'm going to look over the life of the app. Did the  
19 price ever fall over the life of the app? So I did all of  
20 those different experiments.

21 This particular one is the one month before and the one  
22 month after.

23 **THE COURT:** All right. Just, what page is that?

24 **DR. BURTIS:** My pages are sticking together.

25 Does anybody know what page it is?

1 Oh, there it is. It's page 102.

2 **THE COURT:** Oh, okay. And this is the one-month test?

3 **DR. BURTIS:** This is a one-month test. But all of the  
4 results are reported in my report.

5 **THE COURT:** Okay. So --

6 **DR. BURTIS:** They are substantively the same.

7 **THE COURT:** Just one second.

8 I do not have a table on page 102 of your report. I'm  
9 looking at Docket Number -- it's the sealed version, 254-5.

10 **DR. BURTIS:** Look at 103.

11 **THE COURT:** 103? Figure 13 on 103?

12 **DR. BURTIS:** Yes.

13 **THE COURT:** Okay. That's the one. And this is the  
14 one-month --

15 **DR. BURTIS:** Yes.

16 **THE COURT:** That's the same thing that we were looking at  
17 in this chart.

18 **DR. BURTIS:** Yes.

19 **THE COURT:** Oh, I see. Okay.

20 Okay. Go ahead.

21 **DR. BURTIS:** Okay.

22 **THE COURT:** And what does this represent?

23 **DR. BURTIS:** So the 2 percent represents, across all of  
24 these different SKUs, 2 percent of those SKUs fell in price one  
25 month after the service fee rate reduction.

1 And I was looking at -- I tried to focus my attention on  
2 rate reductions that were at least ten points. So it wasn't a  
3 rate reduction from, like, 30 to 29. It had to go from -- if  
4 it started at 30, it had to be at least -- it had to go to at  
5 least 20.

6 **THE COURT:** And what does that 2 percent mean?

7 **DR. BURTIS:** What that means is that only 2 percent of  
8 those SKUs would have been at a lower price in the but-for  
9 world, and only those consumers then who purchased those SKUs  
10 would have been impacted.

11 And, again, this is just -- this is based on the actual  
12 data. And I had four databases. I had the transactions data.  
13 I created my own data by scraping Google Play. I had their  
14 app-level data. I asked them for more data, you know, so that  
15 I could do these experiments.

16 And I will note that Dr. Williams, one of the developer  
17 experts, did a similar analysis. He didn't have all the  
18 databases. He didn't have my scraped database, for example.  
19 And his experiment was a little different. But for him, he  
20 found 8 percent of the prices were lower after a service fee  
21 rate reduction.

22 So the point is that we -- both of us are finding that  
23 pass-through in this industry, a pass-through of a service fee  
24 rate reduction, at least for the SKUs that we are looking at,  
25 was very infrequent.

1       **THE COURT:** And the number that Dr. Singer got, that  
2       99.99 percent, that's based on the one minus share formula; is  
3       that right?

4       **DR. BURTIS:** Correct.

5       **THE COURT:** Okay. Tell me a little bit about  
6       methodologically -- I get it. Nobody's used it before.  
7       Dr. Singer said he's never used it before. What is it about it  
8       methodologically that doesn't work, in your view?

9       **DR. BURTIS:** Okay. So, first, I want to tell you what it  
10      is, but it sounds like you kind of know already.

11      I want to go to Slide 3.

12      **THE COURT:** Slide 3. Okay.

13      **DR. BURTIS:** And, basically, this is what the methodology  
14      is that Dr. Singer employed. He takes -- he does this for a  
15      developer in a category with a particular kind of monetization  
16      type, like subscriptions, for example; and he counts the number  
17      of sales that that developer made in that month.

18      **THE COURT:** I'm with you on that. Why doesn't -- what's  
19      wrong with this?

20      **DR. BURTIS:** Okay.

21      **THE COURT:** Why is this, in your view, a bogus formula?

22      **DR. BURTIS:** Okay. So one thing I want to -- I want to  
23      explain just the implication of doing it this way.

24      Remember when I said, you know -- I was talking about  
25      developers. And there's, like, thousands and thousands of

1 developers; and more than most of them are really, really  
2 small. Like, you know, 90 percent of them are really, really  
3 small. And that's also true of apps. We have a lot of apps  
4 that are really, really small. So when you use this  
5 methodology -- right? -- and you're calculating the share of  
6 those apps in that way, every one of those shares is going to  
7 be very, very small.

8 And so that -- that is why he gets the result that he  
9 does -- right? -- because you have all these apps; each one of  
10 them has a very, very small share; and the formula is one minus  
11 that share. And so that's kind of the intuition of what's  
12 generating this result.

13 Okay. But in my opinion, there are three flaws with this  
14 methodology.

15 Okay. So the first problem is that this formula, the one  
16 minus the share formula, is the wrong formula for this case.  
17 In this case, we have a service fee rate. And that service fee  
18 rate depends on price. We call it an -- I've been calling it  
19 an *ad valorem* cost. Right? So if the service fee is -- if the  
20 price is a dollar and the service fee is 30 cents --  
21 30 percent, then it's 30 cents. But if the price is different  
22 and that rate is still 30 percent, then the service fees in  
23 dollars changes. Okay?

24 And that is -- it is very different than a per unit cost  
25 because those per unit costs don't depend on price. The price



1 can be whatever, you know, it is; and it's always going to be  
2 whatever -- whatever that cost is per unit. You don't have  
3 that kind of circularity, if you will, between the service fee  
4 rate, which depends on price, and the price. So you've got to  
5 treat these things differently.

6 Dr. Singer's pass-through formula that he found in this  
7 article -- and we can go to Slide --

8 **THE COURT:** I have the article.

9 **DR. BURTIS:** -- 6.

10 **THE COURT:** Yeah.

11 **DR. BURTIS:** If you look at Slide 6, it brings out part of  
12 the article. And it says that the formulas in that article  
13 assume a per unit tax. So the formula is based on a per unit  
14 tax, but what we have in this case is this *ad valorem* cost or  
15 you can think of it as a tax.

16 So there's this fundamental difference between what this  
17 formula is measuring and what Dr. Singer should have measured  
18 in this case. Okay?

19 **THE COURT:** So, and the one minus share formula is not  
20 captured in this Nathan Miller article; right?

21 **DR. BURTIS:** It is, Your Honor. But that formula is based  
22 on a per unit cost. And so that formula, it is in the article,  
23 but it is the wrong formula for this case.

24 **THE COURT:** And so when you say that you've never seen  
25 Dr. Singer's one minus share formula used, it's because of

1 that?

2 **DR. BURTIS:** Well, that -- that is part of it, yeah. But  
3 even -- so the formula itself, one minus the share, is coming  
4 from a particular kind of demand model called the logit. And  
5 that logit demand model is used frequently in the literature,  
6 usually to get at elasticities.

7 But economists do not use the logit model, even when they  
8 have a per unit cost, to get at pass-through rates. That's not  
9 the way that we think about pass-through rates. We don't use a  
10 formula like that. It's too restrictive. Right? There's too  
11 many assumptions built into the logit model.

12 And there are articles, and I cite these in my report. It  
13 says, you know, if you use the logit model to do things like  
14 pass-through, the restrictions are too severe and you're going  
15 to get unreasonable results. You're going to get results that  
16 don't make economic sense.

17 And so even for a per unit cost, I haven't seen  
18 economists -- when they study pass-through, I have not seen  
19 them use that formula.

20 What we usually do and, you know, what I've done many  
21 times -- and, you know, even whoever is on the other side of an  
22 antitrust case, you know, we're always doing the same thing.  
23 We're always saying: Well, I want to look at the relationship  
24 between cost and price. I want to see what happens to price  
25 when cost changes.

1 And that is the standard methodology that we use, and  
2 that's the methodology that I used in the graph that we were  
3 just looking at.

4 **THE COURT:** Okay. Let's just pause there.

5 Dr. Singer?

6 **DR. SINGER:** Yes. Thank you.

7 And Dr. Burtis went into a bit of 2(d), which is fine, in  
8 that section. And I have some really important points I'd like  
9 to make in 2(d). But I think because she came back to 2(a), to  
10 attack the logit, I think it makes most sense if we take out  
11 2(a) and then, if we could, maybe move to 2(d) --

12 **THE COURT:** Fine.

13 **DR. SINGER:** -- afterwards.

14 Okay. So on the logit model, I just have four points.

15 But before I even start off, I just want to say this.

16 Dr. Burtis cited something I said during my deposition. And  
17 you should know, Your Honor, that I tend to do mostly  
18 monopolization cases. And just as Dr. Burtis said, when I look  
19 at pass-through, as I'm doing right now in the *Pork Antitrust*  
20 case, I'm looking at changes in the wholesale prices on changes  
21 in the retail price. Right?

22 In this case, by contrast, we have a problem, and that is  
23 the take rate on 93 percent of the transactions in the  
24 database --

25 Can you put up Slide 4, please?

1           92.4 percent of the transactions in the database were all  
2 at that headline 30 percent rate. It is impossible to try to  
3 find how app prices vary in response to changes in take rates  
4 when the take rates don't change. It's a problem. Right?

5           And even in that very teeny-tiny segment of the pie, the  
6 3.1 percent, the 4-point -- where Dr. Burtis goes looking for  
7 experiments to exploit, it's all botched. And I'm going to  
8 show that to you when we get to 2(d). You can't get any  
9 information out of those changes in the small part of the  
10 triangle, small part of that figure. Okay?

11           So let me now make my -- what we are trying to do is that,  
12 given this limited sample of changes in take rates, I looked  
13 for an economic model of consumer demand that would allow me to  
14 make predictions of how an app developer would change its price  
15 in response to a change in the take rate, given the nature of  
16 the demand that that app developer faced. Okay? That's why  
17 we're here.

18           Point Number 2, the logit model captures the demand faced  
19 by app developers. I couldn't use it if it didn't. Okay? The  
20 logit model is a generally accepted methodology based on  
21 published literature in the field.

22           Can I see Slide 5, please?

23           I was a little surprised when Dr. Burtis said she had  
24 never seen it used. She certainly has read my expert report.  
25 Here is a published article, Your Honor, by Werden and Froeb of

1 the Department of Justice in the context of a merger review.  
2 And in a merger, the merging parties always like to claim that  
3 there are going to be some cost savings that come about from  
4 allowing the two firms to merge. And in a typical merger  
5 analysis, the economists debate whether the price effect from  
6 those cost savings can negate the loss in competition by  
7 allowing two rivals to merge. And whoever wins that battle is  
8 going to have the net -- whether it's going to be a net price  
9 savings for consumers --

10 (Court reporter clarifies.)

11 **DR. SINGER:** So the merger opponents are going to claim  
12 that the anticompetitive effects dominate, and the merger  
13 proponents are going to argue that the cost savings dominate.  
14 But that's the battle.

15 And in those battles, in those merger battles -- which I  
16 don't partake in because my practice tends to take me into  
17 monopolization, which is why I answered the question as I did  
18 in my deposition. In those merger battles, the logit model is  
19 commonly used to map a change in the merging parties' costs  
20 that come about from merger synergies into a change in price.

21 If you think about it, it's precisely what I'm trying to  
22 do here. I need a model that would allow me to map a change in  
23 cost that come about from a lower take rate into a change in  
24 the app developer's pricing.

25 Now, let me move now to --

1       **THE COURT:** So you're saying there's no off-the-shelf  
2 model that fits this? You had to come up with this yourself?

3       **DR. SINGER:** No, Your Honor. Respectfully, that's not  
4 what I'm saying. Let me just try to -- can I put it in my --

5       **THE COURT:** You don't have to be respectful.

6       **DR. SINGER:** I want to be.

7       **THE COURT:** You know better than I do. So you're --

8       **DR. SINGER:** We have one --

9       **THE COURT:** -- saying --

10       **DR. SINGER:** -- of two paths.

11       (Simultaneous speaking; court reporter interrupts.)

12       **THE COURT:** One at a time. I get to go first.

13       Your colleague here says that she's never seen anything  
14 like this before. And what I hear you saying is: Okay. I  
15 adapted something from the merger context.

16       There must be some tool that economists use that doesn't  
17 require you to lean into a wholly different sector.

18       **DR. SINGER:** It's not exclusively used in the merger  
19 context. I'm just using this as an example of how it has been  
20 used in the merger context.

21       What I'm telling Your Honor is that we have one of two  
22 ways to get to the finish line here. One would be the way that  
23 Dr. Burtis and I have seen in monopolization cases before,  
24 where you take advantage of variation in the wholesale rates  
25 and you see whether or not the retailers pass along those

1 changes in the forms of prices. We do a regression. You've  
2 probably seen it yourself. Changes in prices at the retail  
3 changes wholesale.

4 Okay. Given that there is almost no variation in the take  
5 rate here -- right? 92.4 percent of all transactions over the  
6 class period occurred at that 30 percent headline rate -- we  
7 can't use the standard tool; but fortunately, economists have  
8 derived other pathways to try to figure out, to try to estimate  
9 the pass-through rate.

10 And there, you need to describe the demand faced by the  
11 developer because if you know they're facing a linear demand  
12 curve or a logit demand curve or an AIDS -- there are all sorts  
13 of demand specifications -- you can make a prediction about  
14 what the pass-through rate would be.

15 And that's what I've done here.

16 **THE COURT:** Why are you two so wildly different on that?

17 **DR. SINGER:** Why are they -- I imagine that Dr. Burtis and  
18 I both probably spend most of our time in monopolization cases,  
19 typical price-fixing conspiracies where we get to see  
20 variations in wholesale rates. And so the kind of analysis  
21 that we typically employ or I would employ as the plaintiff's  
22 expert, and she would rebut as the defendant's expert, would be  
23 one of these simple regressions of change on wholesale rate,  
24 change on retail rate. That's probably why we both see the  
25 world the way that we do.

1 But what I would submit is that the logit model does get  
2 used in antitrust settings to try to come up with a mapping --

3 **THE COURT:** That's fine. Why are you two so wildly  
4 different? She's at 2 percent and you're at 99.

5 **DR. SINGER:** Oh, that's because her experiments are  
6 botched, Your Honor. And we're going to get to 2(d).

7 **THE COURT:** We're going to jump around because we're  
8 getting on in time.

9 Just tell me why her 2 percent number is not right.

10 **DR. SINGER:** Okay. So, for example, we'll go to her  
11 subscription products. Okay? So I'm moving into 2(d), if  
12 that's okay. We're going to go to her subscription products.

13 She wants to exploit a change in the subscription take  
14 rate in Year 2 of the subscription. Remember, it went from 30  
15 to 15 percent. And she wants to go looking for a change in the  
16 app's price for those subscription products. But Google threw  
17 up an impediment to changing the price.

18 Can I go to Slide --

19 I'm in 2(d) now. It's just going to take me one second,  
20 Your Honor, to tell you the slide number.

21 This is the testimony from --

22 Try Slide 12, please.

23 I'm jumping now to 2(d), Your Honor. Just one second.

24 I'm sorry. Slide 13.

25 This is deposition testimony, Your Honor, from an app



1 developer who is saying that Google didn't provide the  
2 mechanics to lower the price of the subscription service in  
3 Year 2 without also altering the price in Year 1. Okay?

4 And so there are other reasons besides this impediment  
5 thrown up by Google. Let me tell you the second reason.  
6 All right?

7 There was no economic incentive for a developer of a --

8 **THE COURT:** You're saying that you think there's evidence  
9 that after this 15 percent rate went into effect, the  
10 developers could not pass that on?

11 **DR. SINGER:** Correct. They couldn't pass it on without  
12 changing the first-year subscription price for the subscription  
13 products.

14 **THE COURT:** Can't do it; right? Just, as a practical  
15 matter, you can't do that?

16 **DR. SINGER:** They just couldn't do it.

17 And so she's out looking for changes in that second year  
18 subscription because she's focusing on the SKU, and she can't  
19 find the changes. And I'm telling you it's a rigged experiment  
20 because the app developers couldn't lower their prices.

21 **THE COURT:** Pause on that.

22 So, Dr. Burtis?

23 **DR. BURTIS:** Oh, yes. Thank you.

24 So I want to --

25 **THE COURT:** So Dr. Singer is saying --

1       **DR. BURTIS:** Okay.

2       **THE COURT:** -- you looked --

3       **DR. BURTIS:** Got it.

4       **THE COURT:** -- looked in the wrong area, yeah.

5       **DR. BURTIS:** Okay. So he's focusing on subscriptions.

6 Okay? His -- right now he's talking about subscriptions.

7       You can go to Slide 15, and you can see that the same  
8 result exists for IAPs. And this has nothing to do with  
9 subscriptions. These are the results for the one-month  
10 comparison, the six-month comparison, and the life of the SKU.

11       And, by the way, Your Honor, when I did the subscription  
12 experiment, I said: I want to know -- I'm only going to put  
13 this subscription in my analysis if that SKU's rate overall --  
14 right? -- one year -- the SKU doesn't depend on the -- on how  
15 long the subscription is. I want -- I want the rate to go from  
16 30 to at least 20. So that developer had a 20 percent,  
17 you know -- I'm sorry. He was paying a 20 percent rate instead  
18 of a 30 percent rate. And yet the subscription numbers still  
19 are what they are.

20       So Dr. Singer is saying they couldn't lower price because  
21 they would have to -- the thing is, what happened with those  
22 guys in my sample, all of their subscriptions were more than a  
23 year old -- or not all of them, but a large number of them. So  
24 they could have lowered their price if they chose to.

25       **DR. SINGER:** That's not -- that's just not true.

1       **DR. BURTIS:** But --

2       **DR. SINGER:** I'm sorry. That's not a true statement.

3       **DR. BURTIS:** But even so, Your Honor, it doesn't matter.  
4 I mean, most of my SKUs are IAPs, and you can see that the same  
5 result holds for the IAPs. The same result holds for the paid  
6 apps. This is -- it's not just -- this is not being explained  
7 by the inability to change your price. These developers are  
8 simply not responding to the service fee rate reduction.

9       **THE COURT:** All right. Let's not -- I don't -- we're not  
10 going to debate the evidence.

11       So what about IAP and the apps?

12       **DR. SINGER:** No, she got those wrong too. Everything is  
13 wrong. Every experiment that she conducts is wrong.

14       **THE COURT:** Why is that true for those two?

15       **DR. SINGER:** Okay. So I just want to -- before we leave  
16 subscriptions, I didn't hear an answer to whether a developer  
17 had the ability to lower the price in the second year of the  
18 subscription.

19       **THE COURT:** We're going to pass over that.

20       **DR. SINGER:** Okay.

21       **THE COURT:** Just tell me why the other two were not good,  
22 in your view.

23       **DR. SINGER:** Two reasons, Your Honor. One is that she  
24 looks at too narrow of a window. Her windows are one month  
25 before and one month after the price change. What we are

1 trying to --

2 **THE COURT:** Well, I think she did one month; then she did  
3 six months --

4 **DR. SINGER:** I'm going tell you all of them.

5 **THE COURT:** Right.

6 **DR. SINGER:** She looks at one month before, one month  
7 after; six months before, six months after. Then she  
8 introduces a new slide that says "Life of the SKU." We dug  
9 into that a bit. It wasn't much longer. It ranged between  
10 four months and eight months.

11 And the bottom-line takeaway, Your Honor, is we are trying  
12 to model a but-for world in which the take rate was permanently  
13 lower from the inception of the Play Store. Right? We're not  
14 trying to model a but-for world where you go eight years and  
15 then all of a sudden in one month, the take rate gets down.  
16 Prices, of course, are sticky. And you wouldn't expect a  
17 developer to make an adjustment after one month. You probably  
18 wouldn't expect a developer to make an adjustment on six  
19 months. It's just too short of a time frame for the SKUs that  
20 are affected to impact and work their way into the financials  
21 so as to induce the developer to go back and look at its price.

22 Can I pull up, please -- let me see if I can get, on this  
23 point, Slide 14.

24 Her analysis, secondly, it's completely contaminated by  
25 looking only at SKUs. Right? And when you look at SKUs, you

1 miss the forest for the trees. You miss the total revenues  
2 that are affected.

3 So if Google makes a take rate change and it only applies  
4 to the SKU -- right? -- if the SKU -- this is like -- you can  
5 think of a SKU at, like, a supermarket. It's the code. If the  
6 SKU accounts for too small of a portion of the developer's  
7 revenues -- right? -- then the developer isn't going to go back  
8 and reprice its product for the entirety of the product at  
9 issue.

10 And here, in this example, Your Honor, it's my Slide 14,  
11 it shows you again for subscription developers that the SKUs  
12 that were affected -- Dr. Burtis, I think, misspoke when she  
13 said the vast majority of the revenues were from that second  
14 year -- the SKUs that were affected accounted for less than  
15 5 percent of those developers' revenues. So why would you  
16 expect a developer to go back and revisit its pricing when this  
17 effect -- when this take rate reduction touched such a small  
18 percentage of the app developer's revenues at issue?

19 Can I -- is it okay if I can also go to --

20 **THE COURT:** Well, let's hear the answer.

21 **DR. BURTIS:** Okay. Let's start at Slide 16.

22 So this is an example which has been anonymized that is in  
23 the data, and you can see that the service fee dropped from  
24 30 to 15 around sometime in 2017, Your Honor. And you can see  
25 that this price did not change all the way through 2021.

1       **THE COURT:** Well --

2       **DR. SINGER:** Can I respond to that one?

3       **THE COURT:** I'm perfectly fine that you found one example.

4       **DR. BURTIS:** Oh.

5       **DR. SINGER:** She didn't find --

6       **THE COURT:** But my --

7       **DR. SINGER:** She didn't find one.

8       **THE COURT:** Hold on.

9       The issue is, is this so pervasive that it would be  
10      impossible to translate Dr. Singer's work across a class?

11      Now, we visited this issue several times. There are going  
12      to be countless variations here and there. The issue is: Does  
13      it matter? And for me, that means for Rule 23 purposes, does  
14      that mean that common issues are going to be subsumed -- or  
15      "overwhelmed" is a better word -- common issues will be  
16      overwhelmed by individualized inquiries?

17      And, okay. You found one, and I --

18      **DR. BURTIS:** Oh.

19      **THE COURT:** I mean --

20      **DR. BURTIS:** No, no, no.

21      **THE COURT:** But this would be -- you said this was an  
22      anonymized example of one app developer. But --

23      **DR. BURTIS:** The only reason I'm showing you this example,  
24      Your Honor -- and there are a few more line graphs like this in  
25      my report. The only reason I'm showing you this is that

1 Dr. Singer's representation that it was only four to six months  
2 or six to eight months, or whatever he said, is actually not  
3 true. There are some --

4 **THE COURT:** Oh, I see.

5 **DR. BURTIS:** -- apps in here or some SKUs in here that  
6 have quite a long life.

7 **THE COURT:** All right.

8 **DR. BURTIS:** And for those, it would not be true.

9 But I do want to say --

10 **DR. SINGER:** Can I respond to this slide first?

11 **DR. BURTIS:** No. Can I just --

12 **THE COURT:** Just one second.

13 **DR. BURTIS:** -- make this point?

14 Because it's an interesting point that he's making here  
15 about, well, it took longer than six to eight months.

16 So, Your Honor, do you know what that means? That means  
17 that those consumers who bought over that six to eight  
18 months -- right? -- are different than the ones who bought  
19 later. So now what he's saying is, we have to know how long it  
20 would take. We know that the price reduction -- we know there  
21 was no price reduction. Right? But let's say it took six to  
22 eight months. Well, the ones that bought in that pre-period  
23 are not impacted. So, you know, yeah, it's another --

24 **DR. SINGER:** May I respond?

25 **DR. BURTIS:** -- individualized problem with this whole

1 pass-through analysis.

2 **DR. SINGER:** Can I respond?

3 **THE COURT:** Please. Yes.

4 **DR. SINGER:** I just want to make sure. She didn't want to  
5 use the name of the developer. Would you like me to suppress  
6 the name of the developer here as well?

7 **THE COURT:** It's okay. You can use the name, if you'd  
8 like.

9 **DR. SINGER:** Okay. It's iHeartRadio. And this is  
10 really important. Okay?

11 Well, because you made a mistake in the graph. All right?  
12 It happens.

13 But if you could flip back and forth, please, between  
14 Exhibit -- this slide and the following slide, you're going to  
15 show that Dr. Burtis stumbled on two different prices in the  
16 data set for iHeartRadio.

17 I'm going to move over here, Your Honor. Are you going to  
18 be able to hear me if I move over, or should I just stay put?  
19 I'll stay put.

20 **THE COURT:** Just stay there.

21 **DR. SINGER:** If you look at the iHeartRadio on Exhibit 17,  
22 you'll see it at 4.99. 4.99. Now, if we could flip back,  
23 please, to the prior slide, you'll see it at 5.99. How could  
24 this happen? Right?

25 It happened because Dr. Burtis is so singularly fixated



1 with a SKU analysis, she missed the fact that iHeartRadio  
2 introduced a lower price at 4.99 in response to Google dropping  
3 its take rate in July of 2017 from 30 to 15 percent. This was  
4 a special deal that they calculated -- that they struck.

5 And in response to the deal, if I could show Your Honor, I  
6 went back -- when I saw this discrepancy when we got the  
7 exhibits, we went back into the database --

8 **THE COURT:** Let me just make sure I understand.

9 **DR. SINGER:** -- and we calculated --

10 **THE COURT:** Hold on.

11 **DR. SINGER:** Excuse me.

12 **THE COURT:** Let me make sure I understand. So you're  
13 saying on page 16, this is iHeartRadio. On page 16, she has it  
14 priced at 5.99.

15 **DR. SINGER:** Yes.

16 **THE COURT:** And that predates -- that's the pre-15 percent  
17 reduction price.

18 You found that after the 15 percent was implemented by  
19 Google, they actually dropped their price to 4.99?

20 **DR. SINGER:** Let me tell you exactly what I found. Both  
21 prices exist in the database, but iHeartRadio started selling  
22 the 4.99 on the Google Play Store app as opposed to the  
23 4.99 [sic]. Here's how I know.

24 As soon as I saw the discrepancy of 4.99 to 5.99, I went  
25 into the sales data, the transaction data; and I took a

1 weighted average of what iHeartRadio was making for the  
2 product iHeart Plus -- right? -- which contains multiple  
3 SKUs.

4 The reason why she missed it is because all of her  
5 analyses are SKU focused and this contaminates everything that  
6 she does. She's missing the forest for the tree.

7 May I draw what happened?

8 **THE COURT:** This is endemic to her analysis.

9 **DR. SINGER:** Endemic to her analysis.

10 May I draw what happened, Your Honor, after December 2017  
11 on --

12 **THE COURT:** Sure. Yes.

13 **DR. SINGER:** So the weighted average starts falling from  
14 5.99 to 4.99, and it asymptotes -- which is a fancy word --

15 (Court reporter clarifies.)

16 **DR. SINGER:** I'm sorry. I got so excited about this  
17 example.

18 It asymptotes at 4.99. It's a fancy word for it  
19 approaches and then it basically hovers at 4.99.

20 So what I've done, Your Honor, I've drawn this on for you.  
21 And if I could just introduce it. May I just pass it up to  
22 you? Is that okay?

23 **THE COURT:** Sure. Hand it to the CRD.

24 (Document handed up to the Court.)

25 **THE COURT:** Thank you. Okay.

1       **DR. SINGER:** And so this is the takeaway, Your Honor, from  
2 this whole exercise. I assert that with the exception of five  
3 cherry-picked examples, all of Dr. Burtis's analyses focus on  
4 too narrow of a window: one month or six months and then  
5 she's done this life of the SKU, which is four to eight months.

6       She comes back with five cherry-picked examples, which, by  
7 the way, shouldn't surprise you in a database of hundreds of  
8 thousands of apps and millions of transactions that she can  
9 find five. But even on her favorite, the iHeartRadio, it  
10 actually shows example of pass-through.

11       Can I show you how it performs relative to the --

12       **THE COURT:** Very quickly. This is a little more granular  
13 than I actually find useful. Just round it out. Then I want  
14 to ask my next big question.

15       **DR. SINGER:** May I go --

16       **THE COURT:** Sure.

17       **DR. SINGER:** Can I go to the flip chart?

18       **THE COURT:** Yeah. Use the whiteboard.

19       **DR. SINGER:** So the question is: What does the logit  
20 model predict for iHeartRadio when it realizes a reduction in  
21 the take rate from 30 to 15 percent? Let me show you exactly  
22 what the logit model predicts.

23       The logit model says, start with the original price of  
24 5.99 -- right? -- and subtract one minus the developer's share  
25 within the category.

1       We didn't get to talk about these, but Google picked the  
2 categories by design, and then app developers select into that  
3 category in a way to position themselves in the marketplace.  
4 All right?

5       I calculate that iHeartRadio's share within the category  
6 is 7 percent. So the logit model would predict that its  
7 pass-through would be one minus 7 percent. Right? And it  
8 saved 15 percentage points on that original price of 5.99.  
9 That's what the logit model would predict. And if you grind  
10 through the math, you get a predicted price of \$5.15. That's  
11 what the logit would predict. Right? In the real world, they  
12 dropped their price to \$4.99 -- right? -- which is off by 16  
13 cents. Right?

14       But this is her favorite example. And her favorite  
15 example confirms the predictive power of the logit here.

16       **DR. BURTIS:** May I respond?

17       **THE COURT:** Please.

18       **DR. BURTIS:** Okay.

19       **THE COURT:** Then we're going to move on. But go ahead,  
20 yeah.

21       **DR. BURTIS:** So -- so the graph on my Slide 16, there are  
22 people who are buying at 5.99. So those people who  
23 purchased -- this isn't a made-up line. There are transactions  
24 that occur at 5.99. So --

25       **DR. SINGER:** Yeah.

1       **DR. BURTIS:** I'm sorry.

2       Dr. Singer's claim here is that in over 450,000 of these  
3 SKUs, you know, all of these developers, even if they only had  
4 one SKU, introduced another SKU, and then somehow there was a  
5 weighted average that explains everything. So I -- he did  
6 not -- he certainly did not make that claim in his report, in  
7 his reply report, Your Honor. You know, he did not show -- he  
8 certainly did not establish that.

9       The last thing I do want to say is, going back to his  
10 formula, the one minus the share formula is wrong. Okay? If  
11 he wanted -- if he's trying to prove something with his  
12 formula, he needs to use the formula that actually works. Even  
13 with the logit model, it has a service fee rate. And it is not  
14 that formula.

15       So, and we can go through and I can explain to you why  
16 that is, but that is the wrong formula.

17       **THE COURT:** All right. I think that's covered enough on  
18 your part.

19       Here's how I want to close this out. I am tentatively,  
20 more or less, comfortable with the service -- the developers  
21 side of the platform, two-sided platform, all right, in terms  
22 of calculating a but-for rate.

23       What is much less clear to me, Dr. Singer, is why a  
24 developer would have passed through to the consumer any savings  
25 that would have been the result of a reduced rate charged by

1 Google and, more importantly, how you would establish that on a  
2 class-wide basis.

3 **DR. SINGER:** Sure. So let me break that -- it's a  
4 two-parter.

5 So why would you do it? Why would you do it is that  
6 you're competing against everyone within the category. Right?  
7 And if you're similarly --

8 **THE COURT:** Are you really? I mean, one of the charms of  
9 games is that there are killer games, that only that one game  
10 will do and people love it and it's a unique product, and  
11 that's why they make billions of dollars after their initial  
12 development costs, because they're not substituting in some  
13 other game. Someone who wants to play Fortnite is not  
14 necessarily playing Madden NFL. So they're unique. They  
15 strike me as much more --

16 **DR. SINGER:** Yes.

17 **THE COURT:** -- unique.

18 **DR. SINGER:** And the logit model allows for some product  
19 differentiation, exactly what you said. That is, they're not  
20 perfect substitutes. These games with --

21 **THE COURT:** My point is, though -- let me just jump in, in  
22 the interest of time -- if you have a game that everyone loves  
23 and there's no substitute for it, why ever would you pass any  
24 cost reduction on to your consumers?

25 **DR. SINGER:** That's a great --

1       **THE COURT:** Why wouldn't you just add the 30 percent to  
2 your own account?

3       **DR. SINGER:** It's a great question. And the logit model  
4 predicts that if you so dominate your category, the way that  
5 you suggest -- remember, I did a second cut in my reply report  
6 by subcategories. So if your game so dominates the category  
7 such that its share is close to a hundred percent, the logit  
8 model would predict that you wouldn't pass through any of the  
9 savings. Right?

10       If you were at 95 percent within your category -- for  
11 example, Pandora is at 75 percent within the music category.  
12 So the logit model predicts that Pandora would only pass  
13 through 25 percent of a savings from a take rate reduction,  
14 which should be very intuitive.

15       In a -- we use the word "atomistic." But a very small  
16 firm that lacks market power prices, according to economic  
17 theory, at marginal cost, and so it passes through 100 percent  
18 of any cost change. Just as the logit model would predict if  
19 your share was zero, you would pass through a hundred; but as  
20 you gain market power --

21       **THE COURT:** This is where I'm not seeing why class-wide  
22 treatment makes sense when there's this variation in the  
23 pass-on rate.

24       **DR. SINGER:** Okay.

25       **THE COURT:** You have a heavyweight, you think -- I'm just

1 talking among friends here; so nothing is carved in stone.

2 Every category is going to have a heavyweight or two. The  
3 market leaders, so to speak. Everybody wants to go to Spotify.  
4 Everybody wants to go to whatever the food and wine site is.  
5 Okay? And then there are going to be a number of people trying  
6 to catch up.

7 So I just -- I'm not -- how do you come up with a single  
8 uniform figure that would be the basis of consumers' antitrust  
9 injury?

10 **DR. SINGER:** I allow for, Your Honor -- remember in my  
11 Table 14, I compute aggregate damages for each category  
12 separately. Right? So I'm allowing for variation in  
13 pass-through rates. When I -- I first solve for the change in  
14 the take rate, and then I apply the category-specific  
15 pass-through rate.

16 So to use your example in music, where music is dominated  
17 by Pandora with a 75 percent market share, the average  
18 pass-through rate in the music category, you'll see on that  
19 table, is around 40 percent. Now, we know from what we talked  
20 about earlier that the average across all categories was  
21 89.9 percent.

22 So I'm allowing for the possibility that for those  
23 categories or subcategories that are dominated by a single  
24 developer or maybe two developers, the pass-through rate will  
25 be lower.



1 But what I'm offering is a common methodology that will  
2 give you the predicted pass-through rate for all developers.

3 **THE COURT:** Well, just pause for a moment.

4 **DR. SINGER:** Sure.

5 **THE COURT:** Just tell me how that -- what the methodology  
6 is that allows you to reliably and accurately predict, just for  
7 lack of a better word, that developers' greed is not going to  
8 get in the way.

9 In other words, how do you know someone's not going to  
10 say, "This is fantastic. Google has gouged me 30 percent. Now  
11 they're only gouging me 15. That other 15 is going right in my  
12 account"?

13 **DR. SINGER:** I think the question, as I'm internalizing  
14 it, is: How do you know that the logit model is reliable to  
15 make predictions in the but-for world here? That's how I'm  
16 internalizing it. Is that okay?

17 **THE COURT:** That's fine.

18 **DR. SINGER:** All right. And you don't know until you test  
19 it. And so the very first thing that I did was I gathered all  
20 the data and I ran separate regressions by category.

21 And the logit model makes a very specific prediction about  
22 the relationship between an app's share within its category and  
23 its price; and, in particular, the prediction is that as the  
24 app's price goes up, it should lose share within the category,  
25 reflecting the fact that all of these apps within the category

1 are substitutes in some way, in some way.

2 And I estimated this model for every category, and I found  
3 a very tight fit. What I mean by that is that the coefficient  
4 that related an app developer's price with an app developer's  
5 share was negative and statistically significant at the highest  
6 levels of statistical significance, the 1 percent level. And  
7 the R-squared was over 86 percent. That is, the model -- the  
8 logit model was explaining 86 percent of the variation in an  
9 app's share within the category.

10 **THE COURT:** But 86 percent is a little low, isn't it?

11 **DR. SINGER:** Now, in terms of R-squared, Your Honor, it's  
12 actually pretty high in terms of published work in R-squared.

13 But the real statistic of the two that matters is the  
14 p-value on those price parameters. What I found was that for  
15 34 of the 35 categories, transportation is an outlier. It was  
16 a category that Google actually removed in 2016. But  
17 transactions -- a few scant transactions remained, so I left it  
18 in as a category.

19 For 34 out of 35, the data obeyed the prediction of the  
20 logit model. Right? I couldn't have used the logit model's  
21 implied pass-through rate of one minus the developer's share  
22 unless I tested and confirmed for myself --

23 **THE COURT:** You think there's a single number that can be  
24 used for all of the consumer transactions?

25 **DR. SINGER:** I don't. I don't, Your Honor.

1 I used the 89.9 to plug into the Rochet-Tirole model --  
2 and this is an important caveat -- when I'm solving for a  
3 but-for take rate.

4 When I do the Play Points model, we get to consumer injury  
5 without recourse to a pass-through rate. Pass-through is not  
6 necessary for the Play Points model. That's that second  
7 iteration of Rochet-Tirole.

8 But when we go down the take rate path, we need to plug in  
9 the average pass-through rate so that we can get a singular  
10 but-for headline rate. Right? But then once we know what the  
11 but-for take rate, the headline rate is, we allow the take rate  
12 to vary by category, and we allow the pass-through rate to vary  
13 by category based on how individual apps dominate, you know,  
14 the shares within the category so that we can arrive -- this is  
15 Tables 13 and 14 that we looked at earlier -- so that we can  
16 arrive at a category-specific damages, which is a pot of  
17 savings that come off the actual savings.

18 **THE COURT:** By app category?

19 **DR. SINGER:** By each of the 35 categories.

20 Dr. Burtis got upset when I lumped the games together.  
21 And so even though the parameter and the games model was highly  
22 statistically significant and negative, I went back and I used  
23 Google's designated subcategories for games.

24 **THE COURT:** Let me ask you this.

25 **DR. SINGER:** Yes.

1       **THE COURT:** I'm not on any of these devices. So I think I  
2 understand how this works, but just give me a break if I get it  
3 wrong.

4       But I'm on Google Play. I have an Android phone. I'm on  
5 Google Play. I buy one app, one app, and it's a sports app.  
6 It helps me keep track of my swimming workout. Okay? And it  
7 costs me -- it's 4.99 a month. That's it. That's all I have.

8       What check am I going to get?

9       **DR. SINGER:** Can we look at Table 14? I'll tell you  
10 exactly.

11       **THE COURT:** Sure. Yeah. Just tell me mechanically. I'm  
12 not so interested in the number, but how you're going to derive  
13 that.

14       So Table 14. Okay.

15       **DR. SINGER:** Oh, yes. I'm going to have to look at my  
16 report.

17       **THE COURT:** Is it Table 13?

18       **DR. SINGER:** No. I think 13, Your Honor, is for the  
19 initial market, the Android app distribution market; but in  
20 your hypothetical, I take it there was no price to download the  
21 app in the first instance. So we're in in-app.

22       **THE COURT:** It's just a monthly fee.

23       **DR. SINGER:** Right. Right, right, right. Okay. So let's  
24 look at Table 14.

25       Do you happen to have the page number in front -- oh, I

1 got it.

2 **THE COURT:** 134.

3 **DR. SINGER:** Okay. All right.

4 All right. So we have a consumer who made one purchase  
5 within the sports category; right?

6 **THE COURT:** Yes.

7 **DR. SINGER:** And so what we do is we say that for every  
8 \$10 of expenditure that that consumer made during the class  
9 period, we can figure out that they were overcharged on the  
10 order of 9.9 percent.

11 And we get there by comparing the actual take rate to the  
12 but-for take rate within the category. Right? That was from  
13 the Landes-Posner model.

14 And then we look at what the pass-through rate is for  
15 sports. You'll notice, Your Honor, it's at 81 percent. That's  
16 lower than the typical category, and that's because there's a  
17 few guys in there who really dominate the category. Right?

18 **THE COURT:** That number is a product of the logit formula;  
19 right?

20 **DR. SINGER:** Correct. Correct.

21 **THE COURT:** Okay. All right.

22 **DR. SINGER:** And you'll see what their but-for expenditure  
23 would have been for every \$10 they spent, and the savings is  
24 99 cents, and so that would mean a 9.9 percent.

25 That means that if a consumer class member stepped forward

1 and said that they had spent a hundred dollars, we could figure  
2 out precisely what their overcharge was.

3 **THE COURT:** All right. So the method is the same,  
4 regardless of the app category. It's going to have different  
5 numbers within each app category, but the method is uniform for  
6 all the app categories.

7 **DR. SINGER:** Of course. And there's one last point, as I  
8 pointed out in my report. Then I'll turn over the mic, I  
9 promise.

10 I could do this at an app-by-app level as well, but the  
11 table that I would have presented to you would have gone on  
12 for -- yes. But mechanically, it's just writing code in the  
13 computer. We could allow for these percentage overcharges to  
14 vary by app. But what I've offered is a reliable and common  
15 methodology that could apply to every member of the class.

16 **THE COURT:** All right. Now, just at the methodology  
17 level, Dr. Burtis --

18 **DR. BURTIS:** Yes.

19 **THE COURT:** -- not the inputs and outputs, but the macro  
20 level --

21 **DR. BURTIS:** Yes. I do want to say one --

22 **THE COURT:** -- what's wrong with this?

23 **DR. BURTIS:** Well, there's a couple of things.

24 I do want to go back. This is a -- this is directly  
25 related to the methodology and Dr. Singer's claim regarding the

1 use of the logit model in mergers and his claim that that  
2 article --

3 **THE COURT:** I would love to hear that, but I've got to  
4 tell you something. It's 4:10. I'm getting tired.

5 **DR. BURTIS:** Okay.

6 **THE COURT:** Just help me with the first part.

7 **DR. BURTIS:** Okay.

8 **THE COURT:** What's wrong -- I mean, okay. I know you  
9 disagree with the inputs and the outputs, but the method --

10 **DR. BURTIS:** The method is wrong.

11 **THE COURT:** -- doesn't sound wrong.

12 What's wrong?

13 **DR. BURTIS:** Your Honor, the method is wrong. Okay? And  
14 so the method is wrong because the formula is wrong. The  
15 formula does not take account of the service fee rate being a  
16 function of price. And this is -- you won't want to hear all  
17 this, but if he had done -- if the authors of that article that  
18 he used for that formula had done -- had asked the question  
19 "What is the pass-through rate for a service fee rate?" --  
20 right? -- if you had a cost that depends on the price of the  
21 product, what would the formula be? The formula would be  
22 different. Okay? So the formula is wrong.

23 Okay. Two, the right formula depends on something that  
24 Dr. Singer has not estimated. It depends on the marginal cost  
25 of the developer.

1 And I'm not talking about the marginal cost being the  
2 service fee rate. I am talking about the other marginal costs.

3 This is in Dr. Singer's report. There's a formula for  
4 C-star. It's in paragraph 225 of his report. C-star should  
5 have been what was considered in the pass-through rate. It was  
6 not in that article. Okay?

7 So the formula is wrong. I just want to keep making that  
8 point.

9 **DR. SINGER:** May I respond?

10 **DR. BURTIS:** No, not yet.

11 **DR. SINGER:** Okay.

12 (Laughter.)

13 **DR. BURTIS:** Okay. So, second point, and you are cueing  
14 into an important point when you're asking your question about  
15 the big developer who has a -- is really important in the  
16 category. Okay? Even if you don't believe that the formula is  
17 wrong, Dr. Singer's implementation of this formula, of his  
18 formula, is wrong because, remember, the logit -- the whole  
19 logit demand system works off of shares. Okay? Shares are  
20 super important in that. The dependent variable is a share.  
21 It is not the quantity, like we usually think of in demand.

22 And a fundamental requirement of that logit model is that  
23 all of the products in that share have to be substitutes. I'm  
24 not saying they have to be in the same relevant market. I'm  
25 not saying that. They have to be substitutes, though. And



1 they are not. Dr. Singer acknowledged they are not.

2 I have two examples --

3 **THE COURT:** Well, let me ask you, though. These are  
4 Google categories.

5 **DR. BURTIS:** They are Google --

6 **THE COURT:** Google is grouping all of these apps into the  
7 category.

8 **DR. BURTIS:** No, actually. Google is not grouping them.  
9 Google identifies a set of categories, and then the developer  
10 selects the category that they want to go into.

11 **THE COURT:** So they self-select. But the menu -- Google  
12 gives you 35 choices, or whatever, and says: You pick.

13 **DR. BURTIS:** Yes.

14 **THE COURT:** That's fine. But, okay. So I understand the  
15 interchangeability for share, but this is the way Google does  
16 its business. So Dr. Singer can only work with what Google  
17 actually does.

18 And I don't see why calling it a share, quote/unquote,  
19 within a Google-designated category structure is a problem.

20 **DR. BURTIS:** So it was Dr. Singer's choice to use logit.

21 **THE COURT:** I understand.

22 **DR. BURTIS:** You know, he picked that model. And so if he  
23 picks that model, then whatever Google does and whatever the  
24 categories there are, he is required to figure out what  
25 products are substitutes. He can't use the Google categories

1 if they're not substitutes.

2 And I have two slides, 9 and 10.

3 **THE COURT:** Let me just go back to the sports apps because  
4 those are the only ones I know. I don't run. I swim.

5 **DR. BURTIS:** Right.

6 **THE COURT:** Okay? So I'm never going to use a running  
7 app.

8 **DR. BURTIS:** Perfect.

9 **THE COURT:** So how does that play out?

10 **DR. BURTIS:** They are not substitutes.

11 **THE COURT:** Okay.

12 **DR. BURTIS:** Or -- I mean, that one --

13 **THE COURT:** Dr. Singer would treat them as part of the  
14 same --

15 **DR. BURTIS:** Yes. And that one, I mean, maybe there's  
16 some little ambiguity, Your Honor. But, you know, is Thomas  
17 the Tank Engine a substitute for Doom, you know, this violent  
18 game? We hope not. We hope that parents are more vigilant.

19 The other slide I have --

20 **THE COURT:** Just, I want to hear more. So what? What  
21 does that --

22 **DR. BURTIS:** Yes. So --

23 **THE COURT:** -- lead you to conclude?

24 **DR. BURTIS:** Thank you. Yes.

25 So what he should have done, if he wanted to use the logit

1 model -- it was his choice. He wanted to use it. So if you're  
2 going to use it, do it right. Figure out the groupings of  
3 products that are truly substitutes for one another.

4 You don't -- you don't estimate a games logit. You might  
5 estimate -- you know, I don't know how many -- 10, 12, 20  
6 different games logit equations, all of which have products  
7 that are substitutes.

8 **THE COURT:** Well, now let me ask you. Let's say that's  
9 true, and let's say the top number, whatever, is now 20. How  
10 does that affect the output for that equation?

11 **DR. BURTIS:** Well, first of all, that whole exercise is a  
12 complicated and individualized analysis, because now you're  
13 going app by app and you're trying to figure out which category  
14 does this app go in. Is there a category I need to construct  
15 with a certain set of apps? That, in and of itself, is a very  
16 individualized analysis.

17 **DR. SINGER:** Is it okay if I respond?

18 **THE COURT:** Go ahead.

19 **DR. BURTIS:** Okay. So the other thing that I --

20 **THE COURT:** Okay. So then what does that do to the  
21 number? So how does that make the number -- if you did it that  
22 way, how would that make the number -- would it make it bigger?  
23 Would it make it smaller? What would the impact on the number  
24 be?

25 **DR. BURTIS:** So what I would tell you is, first of all,

1 you'd have a lot more numbers. Right?

2 And, by the way, all of this is not really addressing your  
3 question about the dominant app because they're all averages  
4 over these categories or subcategories. Okay?

5 But we still -- we still haven't solved a major problem  
6 with this formula. Now we have all these logit equations.  
7 Right? But now we need the right formula. And in order to get  
8 the right formula, now we are on another individualized  
9 analysis. We need to go find the marginal cost of these apps  
10 because if that marginal cost is zero, then the pass-through  
11 rate is zero.

12 And in this industry, what does marginal --

13 **THE COURT:** And that's by operation of the formula?

14 **DR. BURTIS:** The right formula, Your Honor. The right  
15 formula. Okay?

16 And let me just say one thing about this, one last thing.  
17 All of what I'm telling you -- right? -- that you have to  
18 consider the marginal costs of the developer; you have to have  
19 the right formula and the economic literature that supports  
20 that; the theoretical literature; the empirical literature --  
21 all of that is consistent with my results where I go and I look  
22 at all of those SKUs SKU by SKU and I say: What happened to  
23 the price? You know, did it change when there was a service  
24 fee rate reduction?

25 All of that economics is consistent with that data,

1 because what we know about this industry -- we know two  
2 important things about this industry. One is that the marginal  
3 costs of many of these developers are very low. This is in the  
4 economics literature, article after article.

5 **THE COURT:** Isn't that kind of the issue? I was just  
6 thinking that. I mean, in software, typically, the marginal  
7 costs are --

8 **DR. BURTIS:** Yes.

9 **THE COURT:** -- almost always getting close to zero  
10 because --

11 **DR. BURTIS:** That is correct.

12 **THE COURT:** -- once you make it, you just copy it.

13 **DR. BURTIS:** Exactly. And once you have an app and a  
14 consumer is clicking on that app, buying the sword or the jewel  
15 or whatever it is, there's no marginal cost to the developer.

16 **THE COURT:** But you're saying -- you're faulting  
17 Dr. Singer for not looking at marginal cost when I think a fair  
18 presumption is the marginal costs are fairly low and fairly  
19 standardly low.

20 **DR. BURTIS:** Well, the marginal costs are -- I would say  
21 it is typical. It is, I think -- I don't think that we can  
22 assume everybody's marginal cost is zero; and I have some  
23 examples of why you can't just assume everybody's marginal cost  
24 is zero.

25 But if the marginal cost is zero, the pass-through rate is

1 zero.

2 **THE COURT:** They're going to have some cost. It's not  
3 entirely -- somebody still has to get paid to press the button  
4 to copy the software, something.

5 But my point is, it seems to me a fairly standard number,  
6 in the 1 percent range -- I'm just making it up -- would not be  
7 an unreasonable assumption, given the nature of the software  
8 industry. And I don't know why then you fault Dr. Singer for  
9 not making an individualized inquiry when it is probably not  
10 entirely -- it's probably not implausible to assume that  
11 there's an industrywide marginal cost number of X.

12 **DR. BURTIS:** Well, Your Honor, if that's true, if the  
13 marginal costs are very close to zero, and there's one  
14 more characteristic of this business --

15 **THE COURT:** It's not zero --

16 **DR. BURTIS:** -- that's important --

17 **THE COURT:** -- but it's close to zero.

18 **DR. BURTIS:** Okay. And the second characteristic of this  
19 business -- and I think Dr. Singer agrees -- is that prices are  
20 sticky. We see 90-some percent --

21 **THE COURT:** Don't go to prices. Let's just --

22 **DR. BURTIS:** This all has to --

23 **THE COURT:** Hold on. Stop. Stop.

24 **DR. BURTIS:** Okay.

25 **THE COURT:** Finish the marginal cost point.

1       **DR. BURTIS:** Okay.

2       **THE COURT:** Let's just say it's 1 percent for everybody.

3       **DR. BURTIS:** Okay.

4       **THE COURT:** Why is that a problem?

5       **DR. BURTIS:** So the pass-through rate is going to be  
6 proportional to marginal cost. So if the marginal cost is  
7 really low like that, the pass-through rate is going to be  
8 really low. Okay? And that's just math. That's just math.  
9 That's not thinking about, really, the particular  
10 characteristics of these products.

11       Now -- and I don't know that it's 1 percent for everybody.  
12 Right? Maybe it's 10 percent.

13       **THE COURT:** We're just talking.

14       **DR. BURTIS:** Okay.

15       **THE COURT:** It's just my number.

16       **DR. BURTIS:** Right, right.

17       But now the question is -- the ultimate question is: Is  
18 this developer going to pass through that service fee rate  
19 reduction? If the marginal cost is very low like that, they  
20 are going to pass -- they're going to change their price just a  
21 tiny bit. Okay?

22       But the other thing that we know about this industry is  
23 that a lot of developers in the actual world use these focal  
24 point prices. Their prices are sticky. They don't change them  
25 for every little change in cost.

1       So you put those two factors together, and now you're  
2       talking about a large percentage of these developers are not  
3       passing through the service fee rate reduction, which, again,  
4       is consistent with what I found in my -- my analysis of the  
5       actual data.

6       **DR. SINGER:** Your Honor, can I get a word --

7       **DR. BURTIS:** What that means --

8       **DR. SINGER:** Can I get a word in?

9       **DR. BURTIS:** I'm sorry. Let me just finish.

10      **DR. SINGER:** This is like a filibuster right now.

11      **THE COURT:** All right. Please, complete your --

12      **DR. BURTIS:** The last point or the bottom line,  
13      Your Honor, is that in order to know that, in order to know  
14      what -- whether or not the developer is going to pass through  
15      that service fee rate reduction, you've got to know what the  
16      marginal cost is, and you've got to know whether the developer  
17      is focal point pricing and would continue to focal point price  
18      in the but-for world.

19      **THE COURT:** And you're saying Dr. Singer did not have that  
20      in the logit equation?

21      **DR. BURTIS:** There's no marginal cost in his formula.  
22      There is no adjustment for focal point pricing.

23      **THE COURT:** All right. Let's close it out, and then I'm  
24      going to see if there are any questions.

25      **DR. SINGER:** Okay. That was a lot.



1       **THE COURT:** Actually, I don't think it was.

2       **DR. SINGER:** Well --

3       **THE COURT:** She's faulting you for saying that your logit  
4 equation --

5       **DR. SINGER:** Yes.

6       **THE COURT:** -- didn't include marginal cost or sticky  
7 prices.

8       **DR. SINGER:** Okay. Let's start with the logit formulas.  
9 Is it okay if I put up the exhibit of the Miller article where  
10 the logit formula pass-through is derived?

11       **THE COURT:** Which article?

12       **DR. SINGER:** Miller, et al.

13       **THE COURT:** You don't have to put it up. I have it.

14       **DR. SINGER:** Okay. Fine.

15       I'd like to call your attention just to three equations in  
16 that article. And she also mischaracterized it to you. So let  
17 me just try to clear up a few things.

18       Can I get that up, please?

19       Do you have it in front of you, Your Honor?

20       **THE COURT:** I do.

21       **DR. SINGER:** Equation 1, to get the pass-through rate, you  
22 need to go through a series of steps. It actually takes three  
23 steps. The first step, Your Honor, Equation 1, is you have to  
24 find out the profit-maximizing price for the firm in light of  
25 the marginal cost that it's facing and the demand that it

1 faces. That's what Equation 1 is showing you.

2 You cannot get the pass-through rate just with Equation 1.  
3 You have to move to Equation 2.

4 Equation 2 tells you how the profit-maximizing price  
5 changes in response to a change in the cost. Right? Only then  
6 do you have something that approximates a pass-through.

7 So when Dr. Burtis asserted that I should have used what  
8 was the Lerner index in paragraphs 224 to 225 of my report,  
9 that is analogous to Equation 1 in Miller's paper. You can't  
10 do anything with Equation 1. You have to take the derivative  
11 of the profit-maximizing price with respect to a small change  
12 in cost.

13 **THE COURT:** I think this is a level of detail that's not  
14 terribly helpful.

15 **DR. SINGER:** But let me --

16 **THE COURT:** Just tell me, why is it okay --

17 **DR. SINGER:** But this is --

18 **THE COURT:** -- for your logit formula to omit marginal  
19 cost and --

20 **DR. SINGER:** Right.

21 **THE COURT:** -- sticky prices?

22 **DR. SINGER:** It does not omit marginal costs because you  
23 can see, Your Honor, in Equation 1 the marginal costs are  
24 considered when solving for the profit-maximizing price. When  
25 you move to Step 2, you get the pass-through rate. Then you

1 have to assume a certain demand structure. And Miller does  
2 several.

3 But when you do the logit, if you look at the math,  
4 Your Honor, Equations 5 and 6, it's really, really complicated;  
5 but all of a sudden comes out of the pass-through rate formula  
6 a very simple equation where the pass-through rate is one minus  
7 the firm's share.

8 Now, this is a standard pass-through model. If you go  
9 through all of his demand systems, none of them include the  
10 marginal cost in the pass-through formula. Right? And that's  
11 a good thing. Imagine if you couldn't use a pass-through  
12 formula unless you could observe the marginal cost of a firm.  
13 That's very hard to do.

14 What the Miller article is giving you is a pass-through  
15 formula that makes use of a change in the marginal cost.

16 **THE COURT:** Oh.

17 **DR. SINGER:** And that's easy to observe.

18 **THE COURT:** Is your one minus the share in this Miller  
19 article?

20 **DR. SINGER:** Yes, Your Honor. It's Equation 6.

21 If you look at Equation 6 in the top, you have to do two  
22 things to it -- three things, in particular. You see the  
23 equation? Equation 2 solves for the take rate. But it gives  
24 you the take rate as a negative of the inverse. You have to  
25 first multiply by minus one, take the inverse, then divide

1 through by total units, and you will get the very simple one  
2 minus share formula. And it's the same one minus share formula  
3 that Werden and Froeb use in their merger article.

4 I don't think there's any dispute as to whether or not the  
5 pass-through formula from logit is one minus the share.  
6 I think we can agree on that.

7 What Dr. Burtis is asserting is that it's somehow infirm  
8 because it doesn't include the term "marginal cost" in the  
9 pass-through. But neither did any of the pass-through  
10 formulas, whether you go the linear model -- the linear model  
11 predicts a pass-through rate of 50 percent, no matter what --  
12 no matter what the parameters of the demand model is. Always,  
13 always 50 percent. It is not a function of the marginal cost.

14 I'd like to clear up one other thing too about this  
15 marginal cost being zero. I will agree -- maybe we can find  
16 some happiness here -- that the cost of replicating the sword  
17 is zero. Right? But when Google focuses on replication costs,  
18 they're playing games. That's not the full marginal cost of  
19 making and selling the app.

20 I cite an article in *Management Science* 2014 by Ghose and  
21 Han that lists all of the marginal costs that app developers  
22 face. Okay? And Dr. Burtis has never addressed that article  
23 in anything that she's ever said or written.

24 Moreover, an app developer faces payment processing for  
25 every sale that it makes. Again, if you focus narrowly on the

1 replication cost, you're going to miss all these marginal costs  
2 that have been identified in the literature.

3 So it's just wrong to assert that marginal costs are zero,  
4 as Google and Dr. Burtis make.

5 I'd like to make --

6 **THE COURT:** I hear what you're saying, is that in the real  
7 world, it would never be zero?

8 **DR. SINGER:** It's not zero.

9 **THE COURT:** It's improbable.

10 **DR. SINGER:** And the beauty of the logit model,  
11 Your Honor, and the linear model and the AIDS model, you don't  
12 need to recover the underlying marginal costs, which would be  
13 almost impossible. If I offered you up a pass-through formula  
14 that was a function itself of the marginal cost, it would have  
15 very limited applicability. How are we ever going to go  
16 observe a firm's marginal cost? Right? They don't record this  
17 in their financials; right?

18 What we can observe is what the change in the marginal  
19 cost would be in a but-for world. If I go from 30 to  
20 15 percent take rate and my app was at \$10, I can figure out  
21 right away what the change in the marginal cost is.

22 And a logit model gives us a way to map that change in the  
23 marginal cost into a change in prices.

24 And I want to, if I could, on this meaningless of Google's  
25 own categories -- is it okay if I can address that?

1       **THE COURT:** I don't need it.

2       **DR. SINGER:** Okay. Good.

3       **THE COURT:** Okay.

4       **DR. BURTIS:** Can I just respond? Sorry.

5       **THE COURT:** Yes, you can have the closing word. And then  
6 I'm going to ask if there are any questions.

7       **DR. BURTIS:** Okay. So, first, Your Honor, I am not saying  
8 that every developer has zero marginal cost. I'm not saying  
9 that. All I'm saying is that we have to know what the marginal  
10 cost is to know what the pass-through rate is.

11       This is not only in Dr. Singer's report in paragraph 225,  
12 but he says those words in his deposition. He says: The  
13 pass-through rate is proportional to the marginal cost other  
14 than the processing rate. I think that's the phrase he used,  
15 "processing rate." So he agrees with this.

16       You need to know the marginal costs. If you have the  
17 right formula, the marginal cost is in that formula. Has  
18 nothing to do with the processing costs. Some of those costs  
19 are likely to be very low, and that is going to cause a  
20 developer not to reduce its price.

21       All of that is consistent -- and, by the way, the  
22 Ghose and Han article, it's fine. I agree, not all developers  
23 are going to have zero marginal costs. Some will; some will  
24 not. We need to do the analysis, the individualized analysis,  
25 to figure that out. Is it hard? Yes.

1       **THE COURT:** How could any developer have a zero marginal  
2 cost?

3       **DR. BURTIS:** Oh. I'm not saying -- I mean, it could be  
4 very, very small. Right? Small enough that it's not going to  
5 matter in the math to --

6       **THE COURT:** I'm asking a different question. How could  
7 any business have a zero marginal cost?

8       **DR. BURTIS:** Okay. So definitionally, what a marginal  
9 cost is, is the incremental cost for an incremental sale. So  
10 you have ten consumers who --

11       **THE COURT:** I know what it is.

12       **DR. BURTIS:** Okay.

13       **THE COURT:** How could you ever have a zero marginal  
14 cost --

15       **DR. BURTIS:** Because --

16       **THE COURT:** -- and be an ongoing business?

17       **DR. BURTIS:** Okay. I think -- it's not their total costs.  
18 It's not even their variable costs. It's their marginal costs.

19       So, for example, some of the costs in Ghose and Han,  
20 they're like: Oh, well, they have to do -- they have to have,  
21 you know, more cloud storage.

22       Well, the thing is, you know, for Consumers 1 through,  
23 you know, 500,000, their storage is fine; but when they get to  
24 a certain level of consumers, they need to buy some more. So  
25 their marginal costs goes shooting up for a few consumers, and

1 then it's going to be zero again because they don't need it;  
2 they've purchased it. There's no more incremental costs  
3 associated with that.

4 And part of this is just the math. You know, this is --  
5 the math is driving our choice of how we think about these  
6 costs.

7 But I want -- I just want to say that this is not -- I  
8 don't think that -- we shouldn't be disagreeing about this  
9 because this issue is in Dr. Singer's report and it is in his  
10 deposition testimony.

11 **DR. SINGER:** Can I clear that up, Your Honor?

12 **THE COURT:** No. That's it for today.

13 Let me ask you this. Look, I have the reports. I spent a  
14 lot of time with them.

15 I want to close out. Are there any questions from  
16 attorneys, which I will screen, but you can certainly ask them?

17 One per side. Who's going to do the plaintiffs?

18 **MS. GIULIANELLI:** I will be asking the questions.

19 **THE COURT:** Come on up.

20 And who's going to do the defendant?

21 **MR. RAPHAEL:** I will, Your Honor.

22 **THE COURT:** Okay. Come on up. You can make your  
23 appearance.

24 **MS. GIULIANELLI:** Good afternoon, Your Honor. It's Karma  
25 Giulianelli for the consumer plaintiffs.



1       **MR. RAPHAEL:** Good afternoon, Your Honor. Justin Raphael  
2 from Munger, Tolles & Olson for Google.

3       **THE COURT:** Okay. Ms. Giulianelli, what would you like to  
4 ask?

5       **MS. GIULIANELLI:** Well, I suppose it depends on how much  
6 time I have; so I'm going to be very selective here.

7       **THE COURT:** All right. What's the first topic?

8       **MS. GIULIANELLI:** The first topic, very briefly because I  
9 am not sure that we got there, but Dr. Burtis mentioned that  
10 Dr. Singer did not -- his model did not take into account focal  
11 point pricing.

12       So I would just like to give Dr. Singer the opportunity to  
13 explain --

14       **THE COURT:** You can ask your opponents, not your own  
15 witness.

16       **MS. GIULIANELLI:** Aah. Okay.

17       **THE COURT:** Do you have any questions for Dr. Burtis?

18       **MS. GIULIANELLI:** In that case, I do.

19       **THE COURT:** Yeah. What's the first one?

20       **MS. GIULIANELLI:** Dr. Burtis, we put up Slide -- let's go  
21 back to -- I think it was your Slide 14, and this was your  
22 analysis --

23       **THE COURT:** 14?

24       **MS. GIULIANELLI:** I think it was Dr. Burtis's Slide 14.

25       **THE COURT:** Okay.

1       **MS. GIULIANELLI:** And it was --

2       **THE COURT:** The 2 percent slide.

3       **MS. GIULIANELLI:** Yes. And it was Dr. Burtis's analysis  
4 of the different take rates.

5       And we talked about iHeartRadio; right? And I just want  
6 to talk about a couple of things there.

7       Am I right that you looked at pricing from SKU data on the  
8 apps? Correct?

9       **DR. BURTIS:** Yes. I looked at a -- the price of a SKU.

10       **MS. GIULIANELLI:** And am I right that a given developer  
11 could have hundreds of SKUs, even though it might offer a much  
12 smaller number of products?

13       So for Tinder, for example, you know, I think from  
14 Dr. Singer's reply report that there are just three major  
15 subscription categories, but Tinder can have over 500 SKUs.  
16 Correct?

17       **DR. BURTIS:** That is highly variable across these  
18 developers. Some have a single SKU.

19       **MS. GIULIANELLI:** Okay. So let's look at iHeartRadio.  
20 So iHeartRadio, if you want to go to your Slide 16 and then  
21 17, now, the reason you had 5.99 on Slide 16 and then 4.99 for  
22 iHeartRadio on Slide 17 is because there were different SKUs  
23 in the database for the iHeart Plus program; right?

24       **DR. BURTIS:** That's correct.

25       **MS. GIULIANELLI:** Correct.

1 And the way you looked at it, you couldn't tell if those  
2 5.99 SKUs that remained there were SKUs for existing  
3 subscribers to the Plus program before Google entered into the  
4 agreement pursuant to a special program agreement, audio  
5 developer program agreement with iHeartRadio in July of 2017;  
6 correct?

7 **DR. BURTIS:** No. Actually, that's not correct.

8 **MS. GIULIANELLI:** Okay. So if you -- so do you know, did  
9 you look at the iHeart Plus -- the line and how much was  
10 iHeart Plus -- did you go and look at the Web or anything  
11 like that from iHeartRadio in, let's say, 2019, what was the  
12 price that was being offered as of that date? Do you know?

13 **DR. BURTIS:** I'm sorry. On the Web?

14 **MS. GIULIANELLI:** Yes, or anywhere. What was  
15 iHeartRadio selling iHeart Plus for, if you know, in 2019?

16 **DR. BURTIS:** I don't know, as I stand here.

17 **MS. GIULIANELLI:** Okay. And you don't know because you  
18 looked at it at an individual SKU level, and so you don't know  
19 if the 5.99 SKUs in the transaction database were there from  
20 existing subscribers -- correct? -- before the agreement with  
21 Google? Am I right about that?

22 **DR. BURTIS:** No, you're wrong about that.

23 **MS. GIULIANELLI:** Okay. Could you explain that, please.

24 **DR. BURTIS:** Sure. So in the transactions data, for a  
25 given transaction, there's information about the SKU, about the

1 price, and about the service fee rate.

2 So this is matching -- the graph, the line graph is  
3 matching the consumers who are paying whatever that price is --  
4 I'm sorry. I can't see it from here -- and the service fee  
5 rate associated with them.

6 **MS. GIULIANELLI:** Okay. So the line graph is matching  
7 only those consumers who are paying 5.99, but that's for that  
8 particular SKU, not for the entire iHeart Plus product;  
9 correct?

10 **DR. BURTIS:** I looked at it on a SKU-by-SKU basis so I  
11 could isolate what happens to individual SKUs, you know, when  
12 that SKU service fee rate changes. That's true.

13 **MS. GIULIANELLI:** Okay. And if there were -- and this  
14 would infect not just iHeartRadio but, for instance, Pandora  
15 and other applications that you looked at too?

16 **DR. BURTIS:** Well, I wouldn't say it infected anything. I  
17 mean, I'm matching the service fee rate to the price. So  
18 I think that's the right way to do it.

19 **MS. GIULIANELLI:** And when you talk about the service fee  
20 rate to the price, you did look at the websites, I think,  
21 because you've got here Slide 17. Did you put this together  
22 yourself? And did you look at these websites for Minecraft and  
23 Pandora and all these things on Slide 17?

24 **DR. BURTIS:** Some of them, I did.

25 **MS. GIULIANELLI:** Okay.

1       **DR. BURTIS:** Actually, some of them are taken from,  
2 I think, Dr. Singer's report. So...

3       **MS. GIULIANELLI:** Yeah. The ones on the --

4       **THE COURT:** If I may, something a little bit more method  
5 and reliability would be more useful to me.

6       **MS. GIULIANELLI:** Okay. And, Your Honor, I think the  
7 reason that I'm asking about this is because:

8       Am I right, Dr. Burtis, that one of your critiques of  
9 Dr. Singer's model is that it's not reliable because you say  
10 that the analysis that you've done here of changes in SKUs in  
11 the way you've looked at it shows that they're not passing on  
12 cost savings? That's one of the reasons that you say his  
13 analysis is not reliable. Am I right about that?

14       **DR. BURTIS:** I think that my analysis -- I mean, I don't  
15 know if I would say it that way. It certainly confirms the  
16 problems that I have found with the reliability of his model.

17       **MS. GIULIANELLI:** And if there's a flaw -- and we've  
18 already talked about, I think, somewhat the subscriptions,  
19 which is that with the subscriptions, developers can't change  
20 the pricing in the second year without also impacting the first  
21 year. So let's set that aside.

22       If there's a flaw in your analysis and you don't pick up  
23 the pricing of the product over time because you've looked at  
24 it at a SKU level, that would impact that critique that you  
25 have of Dr. Singer's methodology; right?

1       **DR. BURTIS:** I disagree. I mean, over 400- -- I think  
2 it's over 400,000 of the 450,000 SKUs are not subscriptions.

3       So basically, I'm not trying to prove there's no  
4 pass-through for every single SKU. I'm not trying to say that.  
5 What I'm trying to say is that we have to look at them  
6 individually, and that when you do that, when you look at all  
7 of these individual products, you see many of them not  
8 responding to service fee rate reductions.

9       **MS. GIULIANELLI:** At least according to the way you look  
10 at it at a SKU level. You did not look at it at the product  
11 level; right?

12       **DR. BURTIS:** So I think you're confused about that. I'm  
13 not -- whatever. I'm using --

14       **THE COURT:** No one is taking you --

15       **MS. GIULIANELLI:** I think one of us is confused about  
16 that.

17       **THE COURT:** Just tell us why.

18       **DR. BURTIS:** For me, the SKU is an easy way to say  
19 "product" instead of saying "paid app."

20       **THE COURT:** Can I just -- so --

21       **MS. GIULIANELLI:** Okay. I think I've made my point.

22       **THE COURT:** This Tinder thing with 450 SKUs but three  
23 products, how does that work out for you? Why are you looking  
24 at 450 SKUs if the reality for a consumer is three products?

25       **DR. BURTIS:** Well, I mean, the issue is, Your Honor, what

1 about those consumers who bought this particular SKU or this  
2 product? Did their price go down when the service fee rate  
3 went down? That's what I'm --

4 **THE COURT:** Well, I know it's getting late.

5 The consumer is buying a product. They're not buying a  
6 SKU; they're buying a product.

7 **DR. BURTIS:** No. They are. They're buying a SKU.

8 **THE COURT:** I want a date in San Francisco. That's the  
9 product they're buying. So how does the 450 SKUs factor into  
10 that?

11 **DR. BURTIS:** A SKU is a product. That's the part I  
12 thought that was getting confusing. It is a product. It is a  
13 very -- it is a very particularly defined product.

14 I go in the database and I say --

15 **THE COURT:** Can we just pause?

16 So, in your view, a SKU is actually something a consumer  
17 is buying?

18 **DR. BURTIS:** Oh, yes, absolutely.

19 **THE COURT:** Okay.

20 **MS. GIULIANELLI:** Do you know, Dr. Burtis, how an app --  
21 if I'm, for example, Tinder, you know, iHeart or Pandora, how  
22 it changes the price? It's through the SKU. But it doesn't  
23 change the product, like iHeart Plus program. It doesn't  
24 change that product for consumers. It's changing the price  
25 through the SKU; is that right?

1       **DR. BURTIS:** If I understand your question, I think  
2       you're -- I think the answer is yes, if I understand you.

3       **MS. GIULIANELLI:** Okay.

4       **THE COURT:** All right. How about just a couple more  
5       questions, Ms. Giulianelli, and then see if Mr. Raphael -- is  
6       that right? -- has questions.

7       **MS. GIULIANELLI:** I just have only a couple of --

8       **THE COURT:** Remember, your arguments are all -- is it  
9       August 4th?

10      **MS. GIULIANELLI:** Yes.

11      **THE COURT:** So you don't have to make them now.

12      **MS. GIULIANELLI:** I will not. I will not.

13      **THE COURT:** Okay.

14      **MS. GIULIANELLI:** In that case, Your Honor, I've got a lot  
15      of questions, but I know when to sit down, and I think it's  
16      time.

17      **THE COURT:** Well, there may be one or two large questions.  
18      This is your chance to ask, because you'll never have  
19      Ms. Burtis here, short of trial, again. So is there a larger  
20      question? If there's not, that's okay. But if there's a  
21      larger question, I'd be happy to let you do it.

22      **MS. GIULIANELLI:** I'm going to sit down. Thank you.

23      **THE COURT:** Okay. All right. Mr. Raphael?

24      **MR. RAPHAEL:** Thank you, Your Honor.

25      Just let Dr. Singer find the mic.



1       **THE COURT:** This is the big-picture portion of the day; so  
2 keep to the big picture. Okay?

3       **MR. RAPHAEL:** I'll do that, Your Honor.

4       First of all, speaking of big picture, we spent, I think,  
5 the first hour discussing the Rochet-Tirole model and the  
6 Landes-Posner model. Do you recall that?

7       **DR. SINGER:** Yes.

8       **MR. RAPHAEL:** Do either of those models tell you what the  
9 pass-through rate for any consumer or any app is?

10       **DR. SINGER:** No. Those models tell you what the but-for  
11 take rate would be in the app distribution market for  
12 Rochet-Tirole and in the in-app services market for  
13 Landes-Posner.

14       **MR. RAPHAEL:** Right. And so even if Dr. Burtis agreed  
15 with you that the Rochet-Tirole model and Landes-Posner model  
16 were done 100 percent correctly, that wouldn't tell you or  
17 anyone else anything about whether there would be pass-through  
18 for any consumer; correct?

19       **DR. SINGER:** That is correct. The pass-through is an  
20 input that is required in Rochet-Tirole but only, Your Honor,  
21 when we do that one path where we're solving for the but-for  
22 take rate.

23       If we allow Google to respond to the advent of competition  
24 by enhancing its subsidy, as it did in Korea and Japan, holding  
25 the take rate constant, we don't even need pass-through to get

1 to consumer injury.

2 **MR. RAPHAEL:** Now, Dr. Singer, in the real world, Google  
3 reduced service fees for a number of developers on a number of  
4 occasions during the class period; correct?

5 **DR. SINGER:** I'll grant you a very limited number of  
6 occasions. There were 50 in the LRAP program that got a  
7 special arrangement for LRAP. And then, of course, we talked  
8 about the subscription products in Year 2 and, of course, the  
9 small developers for the first million dollars. So those are  
10 important deviations from the base -- from the headline  
11 30 percent take rate, yes.

12 **MR. RAPHAEL:** Well, in fact, there were -- I think  
13 Dr. Burtis analyzed over 450,000 times in which a service fee  
14 was reduced for something. Is that right?

15 **DR. SINGER:** Well, but that's a trivial percentage of the  
16 total number of SKUs in the database. Now, her flawed SKU  
17 analysis is missing out on changes in prices when the app  
18 introduces the new price through a new SKU. Now, she's fixated  
19 on the old SKU and she doesn't see the price changing of 5.99  
20 when, in fact, there's a new price in town at 4.99 that just  
21 got introduced through a new SKU.

22 **MR. RAPHAEL:** Dr. Singer, for how many products did you  
23 analyze, when the service fee went down, whether the price  
24 changed in the way that Dr. Burtis did?

25 **DR. SINGER:** I made the determination that, given the

1 limited variation in the take rates -- remember, 92.4 percent  
2 of the transactions are always at 30; right? -- and then when I  
3 learned about the impediments that Google threw up in terms of  
4 subscription products not being able to drop their prices and I  
5 learned that many -- and I was cognizant of the fact that many  
6 of these drops occurred way late in the class period, some of  
7 them in 2021, 2022, we're trying to simulate a world where we  
8 have a permanently lower reduction in take rate from Day 1 back  
9 in. Right?

10 And so I looked at that and I made the determination that  
11 that was the wrong path to go down. I decided that I needed to  
12 characterize the demand the developers faced, and I went out  
13 and tested logit, linear --

14 **MR. RAPHAEL:** Dr. Singer, I asked you how many times --  
15 for how many products you analyzed when the service fee went  
16 down, whether the price changed. Is the answer to my question  
17 zero?

18 **DR. SINGER:** In my initial report, the answer is zero; but  
19 because I wrote a reply report, I had to do an analysis of the  
20 botched experiment in Dr. Burtis's report.

21 **MR. RAPHAEL:** Thank you, Dr. Singer.

22 Now, Dr. Singer, your formula is based on a logit demand  
23 model?

24 **DR. SINGER:** My pass-through formula is based on the logit  
25 demand model that I tested and confirmed best characterizes the

1 demand faced by apps.

2 **MR. RAPHAEL:** Right. And one feature of a logit demand  
3 model is that all goods in the market where demand is being  
4 measured are substitutes; is that right?

5 **DR. SINGER:** I think that all goods have to be substitutes  
6 to some extent. And that could be a very light extent. There  
7 could be --

8 **MR. RAPHAEL:** In fact, it's very particular, isn't it,  
9 Dr. Singer? In a logit model, all of the goods in the market  
10 being studied have to be substitutes in proportion to their  
11 shares of that market; isn't that correct?

12 **DR. SINGER:** I think that's fair, yes.

13 **MR. RAPHAEL:** And is it your opinion in this case that all  
14 apps in every Google Play category are substitutes in perfect  
15 proportion to their share?

16 **DR. SINGER:** Not in perfect proportion. But the P-values  
17 on that coefficient that relates price or predicted price -- we  
18 use tax rates, Your Honor, to predict a price in Stage I as an  
19 instrument -- on the apps share, every one of them with the  
20 exception of transportation was statistically significant at  
21 the highest levels. That's telling you that the prediction of  
22 a logit is true in this case. It didn't have to be true. And  
23 had I gotten the wrong sign or insignificant coefficients, I  
24 would have gone looking for a different demand system.

25 **MR. RAPHAEL:** Dr. Singer, is it your opinion that every

1 app in each Google Play category is a substitute?

2 **DR. SINGER:** I don't think that every one is a good  
3 substitute necessarily. I think Microsoft Excel and Microsoft  
4 PowerPoint are in the productivity category. Does that mean  
5 the category is defined insanely? No, because Microsoft has a  
6 cluster or a package of productivity apps that goes up against  
7 Google's package of productively apps.

8 So it doesn't surprise me that you can find some silly  
9 examples -- Thomas the Train and Doom -- you can find some  
10 silly examples that probably aren't close. But if you're right  
11 and that's what generally characterizes the data, that is, if  
12 Google just willy-nilly slapped these categories together and  
13 you just have a random collection of apps, then when I go to  
14 estimate the logit model, Your Honor, the fit, the goodness of  
15 fit would be zero. The P-values -- right? -- wouldn't be as  
16 good as they are. They wouldn't be statistically significant.

17 That's confirmation that the categories, as designed by  
18 Google in the ordinary course of business, which is also very  
19 similar to what Apple's categories looked like, are meaningful.  
20 They are a meaningful arena of competition around which one can  
21 use for estimating shares for the logit model.

22 **MR. RAPHAEL:** But they're not substitutes, are they?

23 **THE COURT:** I don't have a problem with that. I think  
24 that's fine.

25 Okay. One or two more questions, Mr. Raphael.

1       **MR. RAPHAEL:** Sure, Your Honor.

2       I guess my last question to you, Dr. Singer, is -- I just  
3       want to confirm this -- is that you've never used the formula  
4       that you used in this case to calculate pass-through in any  
5       other case. That's correct?

6       **DR. SINGER:** I think -- I think what I told you in my  
7       deposition -- and same answer now -- is that I've been doing  
8       mostly monopolization. I've been blessed, including in the  
9       pork case, to have variation in the wholesale rates so that I  
10      could exploit that variation by going and looking at changes in  
11      retail prices.

12      When you're confronted with a new empirical problem or  
13      puzzle, you can't always go back to the thing that you've done  
14      in the past. Sometimes you have to have a new tool. And  
15      fortunately, economics has given us the perfect tool for this  
16      kind of problem.

17      **THE COURT:** Well, I think the point is, for me at least,  
18      is total novelty is always -- judges don't like it.

19      **DR. SINGER:** It's not total novelty, Your Honor. The  
20      logit is one of the most commonly used --

21      **THE COURT:** I know the logit is, but not the way it's  
22      being used here. I'm not saying it's an indictment, but it  
23      does require a little more explanation.

24      **DR. SINGER:** I think that --

25      **THE COURT:** Okay. I'm going to have you all in -- I think

1 it's August 4th.

2 Let me just tell you a little tentative, non-binding  
3 tentative, subject to considerably more thinking and, of  
4 course, your presentations when you come back in August.

5 But I am not particularly concerned that this is  
6 inadmissible -- all right? -- with one exception, and that is I  
7 do want to hear a little bit more about logit and the inputs  
8 and how it's working. On the whole, though, I think the method  
9 is -- right or wrong -- certainly sound enough for a trier of  
10 fact to have a decision on whether they buy it or not.

11 I am much more interested in hearing -- so it's perfectly  
12 fine, and I'll take any *Daubert* arguments you have, but I do  
13 want to hear more about logit. It gives me a little bit of  
14 pause.

15 I do want to hear much more about the commonality issues  
16 for Rule 23 purposes when we get back together. On the  
17 two-sided platform, I'm comfortable, I think, with the  
18 developer side and the figures -- the unitary figure for that  
19 side. I think that makes sense based on the evidence that I've  
20 seen. Whether it's persuasive to a jury is a different matter,  
21 or me later. That's fine. This is just getting through class  
22 certification.

23 I am much less confident in the method for determining  
24 what I'll call antitrust injury to the consumers. I'm not sold  
25 that this method is going to be sufficient on a class-wide

1 basis for all of the millions of people, tens of millions of  
2 people that are going to be in these proposed classes. So I  
3 would like to hear more about that.

4 This is in addition to anything else you want to raise.

5 I'm also looking at a couple of other issues. This is a  
6 massively huge class, Ms. Giulianelli. I mean, I think it's  
7 what? Is it 90 million people possibly? That would be a  
8 historically large class, and I need to understand how that  
9 fits into manageability and the core Rule 23 inquiry, which is:  
10 Does this make sense to do in one case? I'm not clear on why  
11 that may be the right answer here.

12 I'm also -- I don't understand how this will translate  
13 into a reasonable approximation of damages for all of the  
14 disparately situated individual consumers. It's one thing --  
15 even if you get past the number, I don't know how you're going  
16 to actually calculate the checks for people who may have  
17 purchased one swim app, and that's it, versus someone who  
18 spends 100, 200 dollars a year on a game app. It's not clear  
19 to me how that's going to work. That all has to be taken into  
20 account for manageability.

21 So those are the things that I'd like to hear more about  
22 when we get to class certification.

23 I'm also a little bit unclear about this division with the  
24 states. I don't really understand what's happening and how  
25 that's working out. So you're going to have to walk me through



1 that, why that makes sense from a Rule 23 perspective.

2 And even if damages don't work, I mean, I think there's  
3 clearly enough for an injunction case to go forward. But  
4 whether the right remedy is a check to 90 million Americans is  
5 a little less clear to me.

6 Okay? So that's just a little bit of a preview for  
7 August 4th.

8 And anything else for today?

9 **MS. GIULIANELLI:** No, thank you.

10 **THE COURT:** Plaintiffs?

11 **MS. GIULIANELLI:** We will be prepared to walk you through  
12 every single one of those.

13 **THE COURT:** Good. Defendants?

14 **MR. RAPHAEL:** No.

15 **THE COURT:** All right. Thank you. It was quite useful.

16 **DR. SINGER:** Thanks, Your Honor.

17 **THE COURT:** Thanks for coming in.

18 Okay. I'll see you then.

19 (Proceedings adjourned at 4:48 p.m.)

20 ---o0o---

21

22

23

24

25

CERTIFICATE OF REPORTER

I certify that the foregoing is a correct transcript  
from the record of proceedings in the above-entitled matter.

DATE: Thursday, July 21, 2022

Ana Dub

---

Ana Dub, CSR No. 7445, RDR, RMR, CRR, CCRR, CRG, CCG  
Official United States Reporter